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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Novelty Advertising Department, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF SECRETARY, DELAWARE, O.,
December 12, 1903.

The Editor of the Novelty Advertising Department, Mr. B. W. Perkins, of South Bend, Ind., desires to announce that his department is now open for contributions to be presented at the Twentieth Annual Meeting, which will be held in Cleveland, March 16th, 17th and 18th.

This department is one of the most attractive features of the convention. Its success, however, depends largely upon the active co-operation of the members. It is, therefore, earnestly hoped that the fraternity will not be backward in sending advertising schemes to Mr. Perkins.

T. C. JONES, Secretary.

BRIEFLY TOLD.

ANNUAL MEETING, SOCIETY OF GAS LIGHTING.—The annual meeting of the Society of Gas Lighting was held in New York city, the afternoon of the 10th inst. There was a large and representative number of members present. The sorrow that had been meted out to the Society, in the death of its former well-loved President, Mr. Eugene Vanderpool, was forcibly brought to mind, in that the Vice-President, Mr. A. M. Smith, directed the proceedings; and the sorrow was further accentuated in the knowledge that another vacant chair bespoke the passing away of the Sage of Taunton, Mass.—the bluff, big-hearted Henry B. Leach, of many days' good fame.

After the usual routine business had been disposed of, the Committee on Nomination of Officers for the ensuing year (Messrs. Elliott, Strecker and Jourdan) reported the following list:

For *President*—Fred. S. Benson, Brooklyn, N. Y.
" *Vice-President*—A. M. Smith, New York.
" *Secretary*—Capt. W. H. White, New York.
" *Treasurer*—Dudley D. Fleming, Jersey City, N. J.
" *Member Executive Committee*—Wm. H. Bradley, New York.
" *Finance Committee*—A. E. Forstall, Thomas E. Byrne and E. E. Witherby.

On motion, Mr. F. C. Sherman, of New Haven, Conn., was directed to cast the ballot of the Society for the election to office of the gentlemen named in the report. His report that the instruction had been carried out was affirmed. Appropriate responses were made by the officers-elect respecting their naming to position. Some other routine business followed, after the disposing of which the Society proceeded to enjoy the annual dinner, which was "tabled" by the genial proprietor of "The Arena" in his usual excellent way. Mr. W. A. Wood, Chief Engineer of the Boston (Mass.) Gas Light Company, who was elected to membership in the Society last November, acknowledged in fervent way his pleasure over becoming a member. Other speechmakers were Mr. C. D. Lamson, President of the Worcester (Mass.) Gas Light Company, President elect Benson, Secretary-elect White and others. All the proceedings were up to the usual high standard of the Society, and were thoroughly enjoyed by those who shared in them.

LIBRARY OF CONGRESS
DEC 21 1903
SMITHSONIAN DEPOT.

NOTES—

WRITE to the Maryland Meter Company, of Baltimore, for a copy of its calendar for 1904. It is a beauty.

MR. F. B. ALDRICH, General Manager of the Pottsville (Pa.) Gas Company, which Company is one of five controlled by certain Pennsylvania capitalists, writing under date of the 12th inst., says: To the Editors AMERICAN GAS LIGHT JOURNAL: I have sent you to-day under separate cover a photograph of the gasfitting department of the Pottsville Gas Company. We have worked continuously since assuming charge a large force of men—the property was taken over January 1st, 1903—and at no time since have we been able to catch up with our work. We have piped and hung fixtures in over 300 old houses, placed over 300 Humphrey inside gas arcs, and 35 Humphrey outside gas arcs, besides selling 482 double-oven, 4-burner, Detroit Jewel gas ranges; all this with anthracite coal mined almost under the town, and sold at a very low price. In the month of August we showed an increase of 76½ per cent. For the year the Company will show an increase in net profits of 53⅓ per cent. over last year. In Schuylkill Haven, Pa., another plant belonging to the C. P. King Syndicate, and of which I have charge, our increase was 92½ per cent. for the same month. The other plants are forging ahead at something near the same rate. This I will say is not only due to selling the goods, but by giving the public the best service possible, looking closely after all complaints, both real and imaginary. We have one complaint man who reports for duty at noon and remains on until 12 (midnight), who is ready to attend to any trouble up to that time. In addition to this we have enough solicitors to thoroughly cover the town, paying them a good commission, and doing enough local newspaper advertising to keep the Editors in good humor. Our increase has been such that we have had to install an additional 6-foot Lowe water gas set, and next summer, in all probability, we will have to install larger purifying boxes and erect an additional holder. Next season we expect to lay a liberal stretch of new street main, thereby making this plant more than double its former capacity. Schuylkill Haven has already reached its limit at the gas works, for we are there now installing a new water gas set, and new scrubbers and condensers.

TO-MORROW the Directors of the St. Charles (Mo.) Gas Company will hold their special election to determine whether or not they will ask for an extension of 10 years to their original franchise, which covenant with the authorities does not expire until 1913. The Company desires to make extensive main additions to outlying districts, but will not incur the necessary expense unless the franchise, under present governing conditions, is named to terminate in 1923.

AT the annual meeting of the Hadley (Mass.) Gas Company no change was made in the executive management.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Mr. Egner Explains His Position.

WASHINGTON, D. C., Dec. 15, 1903.

To the Editors AMERICAN GAS LIGHT JOURNAL: Your correction of Mr. Somerville's figures given in his dissenting opinion of what he thought "Mr. Egner evidently thinks" (pp. 802, 882, 921), makes it incumbent upon me to submit the following reply, and to ask you to kindly give it space in your columns. It does not appear to me that I have given anyone good reason to suppose that I hold such absurd views as that "500 = 670." My position is, that I hold as true, the fact "that it is a sinful waste of money and good material" *for all concerned*, to persist in making and advocating the making of such high candle power gas that it can be only produced by using high priced enrichers, not to mention extra labor and apparatus; for, with the aid of modern appliances now in common use, such as, for instance, the improved Welsbach incandescent burner and plain, simple illuminating gas, such desirable results are obtained as cannot be equalled by the high priced article, *per se*. Consequently, if consumers should be given a 500 instead of a 650 heat unit gas with a corresponding reduction in price, and with which gas satisfactory results as above can be obtained, I hold that such a policy would advantage consumer and producer, present and future generations, and, therefore, is something to be desired by all.

I understand that much might be written in elucidation of the subject, but the above must suffice, at least for the present, so far as the subscriber is concerned. Very respectfully, FREDERIC EGNER.

[OFFICIAL.]

The Gas Exhibit at the World's Fair, St. Louis, Mo., to be Made Under the Auspices of the Western Gas Association.

Mr. Frederick H. Shelton, President of the Western Gas Association, in conjunction with his associate officers, acting with his and their usual celerity and precision, has evolved order from speculation respecting the gas exhibit which it is agreed upon shall be made at the World's Fair to be held in St. Louis next year. The matter respecting the present status of the gas exhibit proposition may be clearly gained from the following official communications. To begin with, the illustration shows the "Palace of Liberal Arts," in which the Western Gas Association will have its exhibit pertaining to the gas industry.

The circulars detailing particulars follow:

PHILADELPHIA, Dec. 10, 1903.

To the Members of the Western Gas Association, and to other Gas Men: In connection with the exhibit of the gas industry, to be held at St. Louis next year, as elsewhere described, the Western Gas Association is proposing to issue bronze medals to pleasurably commemorate the occasion, to be given one each to each exhibitor, and to each contributor to the subscription fund, and to such only. In addition it proposes to issue, as especial marks of distinction, first, second and third prizes, consisting of 15 silver medals, to be awarded: (*a*) For the best or most complete exhibit by a gas company; (*b*) for the best or most complete exhibit by a manufacturer; (*c*) for the best model exhibited; (*d*) for the most novel exhibit, or that evidencing the newest worthy invention; (*e*) for the best and oldest authentic historical exhibit.

Suitable committees for the judging of the exhibits and awarding of the medals will be later appointed.

The above is entirely a matter of the Western Gas Association's own procedure, and aside from any award that may be made by the Exposition authorities. Respectfully, F. H. SHELTON, President,
Western Gas Association.

WHAT THE EXHIBIT WILL BE.

A preliminary circular on this subject has been sent every member of the Western Gas Association, and was published in "Progressive Age," October 1, and the AMERICAN GAS LIGHT JOURNAL, October 5, 1903. In answer to many resulting inquiries for later information, I make these further statements:

I.—*What it Will Be.*—It will be a technical and historical exhibit of the illuminating gas industry in the United States, made up of representative samples or models of machinery and apparatus to be loaned by gas men and manufacturers to the Western Gas Association, which organization will exhibit them.

II.—*What it Will Not Be.*—It will not be a "Trade exhibit" of complete lines of individual manufactures. Lack of space and other reasons preclude this.

III.—*When?*—Throughout the term of the Exposition, viz.: From May 1 to December 1, 1904.

IV.—*Where?*—In Section 33-A, Liberal Arts Building, St. Louis. This is one of the chief buildings, 500 x 750 feet (see cut).

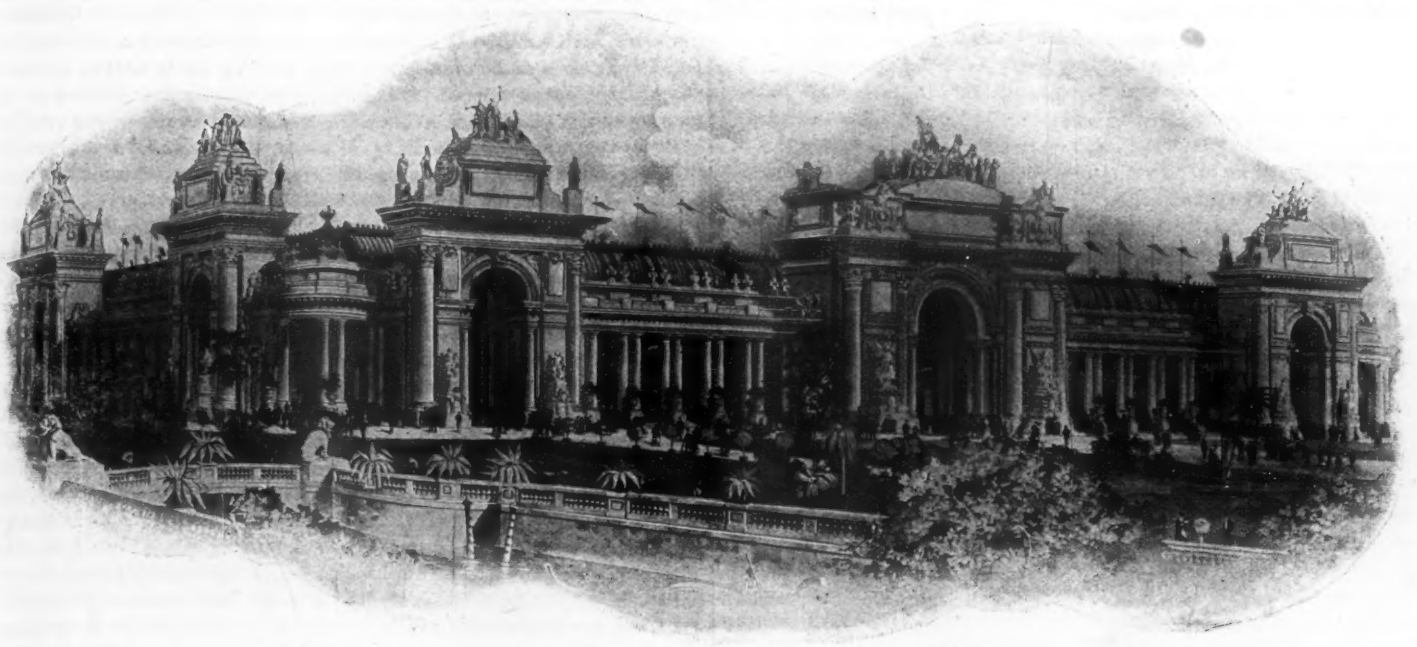
V.—*It Will Comprise Three Classes.*—1st. Models and samples of gas machinery, etc., to show the present methods and state of the art of illuminating gas manufacture and distribution. 2d. Models or samples of the same, showing historical and interesting early forms leading up to present practice. 3d. Gas consuming appliances, especially industrial forms (in contrast to house appliances), in greater variety and number than ever before assembled. These three classes will be divided into 35 groups.

VI.—*Exhibits by Whom?*—The exhibit while arranged for by, and under the auspices of, the Western Gas Association is, however, not limited to that Association; participation by all United States and Canadian gas men and manufacturers of gas machinery or appliances is invited and will be welcome.

VII.—*What is the Sub-Classification?*

(*a.*) MANUFACTURE.

1. Raw Materials.
2. Water Gas Apparatus.
3. Coal Gas Apparatus.
4. Miscellaneous Processes.
5. Scrubbers and Washers.
6. Condensers and Tar Extractors.
7. Exhausters.
8. Purifiers.
9. Station Meters.
10. Holders.
11. Governors.
12. Labor saving Machinery.
13. By-products.
14. Laboratory Apparatus.
15. Photometrical Apparatus.
16. Carburetting Apparatus.



(*b.*) DISTRIBUTION.

17. Mains.
18. High Pressure Distribution.
19. Services and House Regulators.
20. House Meters.
21. Tools.

(*c.*) UTILIZATION.

Light.

22. Flat Flame and Plain Burners.
23. OldHighCandle Power Burners.
24. Incandescent Burners, Single.
25. Arc Lamps, or Cluster Burners.
26. Gas Fixtures.

Heat—Domestic.

27. Ranges.
28. Heaters, Radiators, etc.
29. Water Heaters.
30. Miscellaneous Household Appliances.

Heat—Commercial.

31. All Industrial Gas Appliances.

POWER.

32. Gas Engines.

(*d.*) GENERAL.

33. Books and Educational.
34. Charts and Statistical.
35. Curios.

VIII.—*What Does the Western Assosiation Do?*—It is sponsor for and manages the entire display. It has completed the necessary arrangements for space. It will duly provide the showcases, stands, tables, railings, furniture, power and any necessary motors to operate working models, gas, piping, signs, labels, stationery, attendant, janitor's service, cleaning, storage of crates and packages, unpacking and repacking, printing, etc., supervision and insurance.

IX.—*What is the Gas Man or the Supply Man Desired to Do?*—Four things: 1st. Loan the Western Gas Association, in every instance possible, something suitable for exhibit, as above. 2d. Advise the undersigned now that he (or they) can and will do so. 3d. Have the exhibit boxed and ready to ship by April 1 next, according to the rules on separate sheet herein. 4th. Subscribe what he can towards the cash necessary to put the matter through.

X.—*Credit.*—Every contributor of an article for exhibit will have due credit by suitable card or label affixed.

XI.—*Arrangement of Exhibits.*—All exhibits will be arranged, not by owners or makers, but in groups, according to their character and use, for the best technical effect and showing, and in similar goods no maker will have either pre-eminence or discrimination compared with another.

XII.—*Other Features.*—The Western Gas Association, as its own exhibit, will erect in the very center of the Liberal Arts Building, an iron model, 35 feet high, of the Southwest Pass Lighthouse, which will be constantly illuminated by high candle power gas burners. It is intended that this lighthouse—a beacon of light ever burning—shall fittingly symbolize the aims and the purposes of the Western Gas Association, aside from the sentimental and geographical interest attaching to this lighthouse (the original of which is 125 feet high) as the landmark at the entrance of the Valley of the Mississippi, the territory of the Louisiana Purchase.

XIII.—*Registration Desk and Meeting Point.*—Within the exhibit space will be a desk and chairs, stationery, etc., with an attendant in charge, to form a convenient meeting and resting place, information bureau, etc., for gas men and their friends, throug hout the time of the exhibition.

XIV.—*Who Will Pay for It, and How?*—Gas companies, gas men, and supply men, public spirited and loyal enough to the industry to subscribe, though but a moderate sum each, enough to form a total expected and desired fund of $10,000, with which money the first worthy exhibit of the gas industry in any such Exposition in this country may be accomplished. A good start in subscriptions has already been made. Any unexpended balance of the money collected will be returned pro rata to subscribers. In the last matter of this sort in which the undersigned participated, 17.56 per cent. was returned as not needed.

XV.—*Subscriptions and Further Inquiries* should be addressed to the undersigned, who is in charge of the matter on behalf of the Western Gas Association.

Respectfully,

1004 Penna. Building, Philadelphia. F. H. SHELTON, President.

REGULATIONS FOR EXHIBIT, ST. LOUIS EXPOSITION.

The following, as applying to the gas exhibit, is summarized from the elaborate detailed pamphlets published by the Exposition management, in which the rules and regulations necessary for the good of all concerned are set forth at length.

Boxes.—All boxes, barrels, crates or other packages should be of wood, with screw lids, rather than nails.

Address.—Each package should be addressed to the "President, Louisiana Purchase Exposition Company, St. Louis, Mo.," and be labeled on two sides, with labels that will be furnished by the management (upon request to F. H. Shelton), which labels must state: (*a*) The department for which the exhibit is intended (in this case "Liberal Arts, Section 33-A"); (*b*), the State from which exhibitor ships; (*c*), name and address of exhibitor; (*d*), the number of packages. In this matter of label the owner lending to the Western Gas Association for exhibit, but shipping direct, and the Association, are considered as one —*i. e.*, the joint "exhibitor."

Contents.—Two lists (duplicates) of contents should be inclosed in the package, one to be inclosed in the package and the other to be mailed to F. H. Shelton, with a statement of values, if desired.

Freights.—All freights and express charges must be prepaid, as the Exposition management will not receive any goods with charges "collect."

Storage and Return Shipment.—The Western Gas Association will store all crates, boxes or packages possible, repack and reship to owner at the close of the Exposition.

Removals.—No exhibits can be removed during the Exposition. Once entered they must remain until the close.

Insurance.—The Western Gas Association will insure all exhibits to the best possible advantage, without charge to the owners of the articles loaned. The fire risk is small. There are 5,000 feet of piping, 25 hydrants, 50 hose connections, 2,000 automatic sprinklers, in this building alone, together with a fire department near by. There never has been, moreover, any such Exposition building destroyed by fire.

The Association, further, will have a paid attendant to act as watch-

man during Exposition hours, to minimize the chance of any possible theft, accident or injury to exhibits.

Piping, Power, Light, Etc.—The Association will secure and provide all electric power and motors for running models that may be desired, all gas piping, light, signs, stands, show cases, etc., including cleaning and janitor services, without charge to owners loaning exhibits. There will be no cost whatever to any owner other than boxing, freight and whatever subscription he may kindly tender.

Advertising.—Supply men or manufacturers furnishing samples or models, etc., can supply reasonable, neat printed advertising matter for such, and facilities will be provided for its distribution. The Exposition management, however, reserves the general right to stop any excessive or obnoxious advertising that may be deemed a nuisance.

Exhibit Labels.—The Western Gas Association will provide neat and uniform labels, giving the name of the article, the owner or exhibitor, dimensions, capacities or similar data, and its selling price or value, if the owner so desires. No advertising will be allowed on these label cards, and they will be subject to the approval of the undersigned.

Photographs, as far as possible, should be grouped or mounted on stock size cards, 22 by 28 inches, to fit frames and exhibit stands that will probably be provided for their best showing.

Sales.—There is nothing to hinder owners of trade samples, models, appliances or machinery from making whatever sales they may care to or can from such samples.

Local Rules.—The Exposition management prohibits any smoking, cooking or eating of lunches, etc., within the Liberal Arts and similar buildings.

Time.—Exhibits must be ready for shipment April 1st next, about 4 months from date. The Fair opens May 1, runs 7 months, and closes December 1, 1904. It will be closed on Sundays. Admission will be 50 cents. Exhibits must be removed by March 1, 1905. The Western Gas Association will, without doubt, return all exhibits within 2 weeks after the close.

F. H. Shelton.

[Abstract.—Continued from Page 924.]

PROCEEDINGS, THIRTY-FIRST ANNUAL MEETING, AMERIGAN GAS LIGHT ASSOCIATION.

Held in Detroit, Mich., October 21, 22 and 23, 1903.

Concluding the Discussion on Mr. Glasgow's Paper.

Responding to our invitation (*ante*, p. 924) to furnish a summary of his speech in refutation and explanation of the words of those who took part in the discussion of Mr. Glasgow's paper, Mr. Alex. C. Humphreys said in substance:

Mr. Alex. C. Humphreys (New York) answering the discussion for the author, said, in regard to the unfairness of discussing English practice here, because such discussion might involve an attack on English engineers not present to defend themselves, that if Mr. Doherty's view were accepted it would result in hampering and limiting the work of our technical societies.

In view of the personal nature of Mr. Doherty's and Mr. West's criticisms he would say that Mr. Glasgow, before leaving England, wrote to Sir George Livesey asking him to prepare a written discussion to be presented with the paper: "Sir George Livesey in most courteous terms acknowledged Mr. Glasgow's evident desire for fair play, and said he did not care to take advantage of Mr. Glasgow's offer." Continuing, Mr. Humphreys said that Mr. West had attempted to discuss a question which he did not fully understand. He "would advise Mr. West now not to be satisfied with simply reading the paper. Simply reading a paper of this character was not sufficient." That Mr. West had not studied the paper was evident, since a large part of his argument was based upon an incorrect reading of the paper which led him to combat a statement of Sir George Livesey's by reason of his mis ake as to its authorship. "Sir George Livesey would be the last man to avoid responsibility for this statement as to the special photometers." Taking up the question of the special tests, Mr. Humphreys continued: "Mr. West says that Mr. Glasgow has come over here to try to deceive you in regard to the South Metropolitan gas." Mr. Glasgow had done nothing of the kind; he had presented the conditions as they were acknowledged to exist in London. Mr. Glasgow stated that 16-candle gas was to be found at the official testing stations and that the Parliamentary requirements had been met. The special tests were made to determine how the South Metropolitan gas carried the enrichment—the nominal 16-candle power gas and the nominal 14-candle power were used—and Sir George Livesey said that while these were not complete tests they were fair as *comparisons*. Mr. West had spoken disparagingly of Dr. Clowes. Within a few days an eminent scientist of the English Educational Commission, now visiting this country, had testified to Dr. Clowes' special ability in his particular line of work. Referring to Mr. Glasgow's comparison as to land required for coal gas and water gas works, which Mr. West questions, Mr. Humphreys said that Mr. West could "See across the river from New York a water gas plant of a daily capacity of 30,000,000 feet of gas on 6 acres, and with 10,000,000 cubic feet storage capacity." In regard to coke piles, Mr. Humphreys said he had, some years ago, been through many gas yards of Great Britain and saw many large piles of coke: "In a number of cases, where then there were immense coke piles, the yard space is now occupied by the greatest coke consumer—that is, the water gas plant." Mr. West had questioned the accuracy of Mr. Glasgow's comparative table so far as it refers to labor costs of water gas and coal gas by machine stoking. "We know," said Mr. Humphreys, "That Mr. West does fine work with his machine stokers; but, bear in mind, Mr. Glasgow's argument does not in the slightest degree depend upon the absolute accuracy of the comparisons shown in that table." Again, Mr. West's arguments in regard to the two gases tested by Mr. Glasgow were based on misconceptions. The simple question asked by Mr. West why Mr. Glasgow did not make the comparison between the enriched 16-candle power gas and the South Metropolitan Company's 14-candle power gas is an admission that Mr. West does not understand why Mr. Glasgow made the investigation. Mr. Humphreys brought out that the South Meteopolitan Company, acting under authority of Parliament, supplied its consumers with a gas of reduced candle power at a reduced price. The proposition was then made to force The Gas Light and Coke Company to make a reduction of 2-candle power in its supply, and in that connection make a certain reduction in its price to its consumers. "It was for the Company to determine what would be the commercial result of such a reduction; and as in case of reduction in candle power, the water gas would still be used as an auxiliary, the comparison had to be made with 14-candle mixed gas." In regard to the Dessau and Bunte experiments, Mr. Humphreys could quite understand that Mr. West might fail to see that point. It seemed hardly worth while for Mr. West to express an opinion thereon, since he admitted having never seen the record of these experiments; Mr. Glasgow had seen and studied it, and showed that the conclusions drawn therefrom were worthless. Mr. Humphreys thought that if Mr. West could show us how to make straight coal gas that would not deposit naphthaline we could make it worth his while, and that there would be a "Great future for Mr. West in this country if he will show us how, by the employment of higher carbonizing heats, to distill from a given quantity of coal not only an increased volume volume of gas but to give to that increased volume a higher calorific power." In closing, Mr. Humphreys said it was not worth while to go into any calculations with Mr. West at the present time. If Mr. West would, on his return to England, study the paper carefully and prepare a reply, Mr. Humphreys could promise him that it would receive careful attention and a careful reply, if there were any necessity therefor.

Second Day—Morning Session.

The Associafion reassembled pursuant to adjournment. The first business in order was the

Report of the Committee on President's Address,

which was presented by Mr. Walton Clark, as follows:

To the American Gas Light Association: Your Committee on President's Address, for the year 1903, has the honor to present the following repor.:

It is the understanding of your Committee that its duty is to comment frankly on the address, commending such opinions expressed by th: President as are agreeable to the sense of the Committee, and criticizing the attitude of the President, if in anything he has expressed opinions that do not commend themselves to the judgment of the Committee.

The address gives evidence that your President has bestowed upon it such thought and care as are to be expected from a man who feels the responsibilities of the exalted position Mr. Miller now holds, and knows that his utterances will have weight with the men who have elected him thereto.

We recommend to your careful thought Mr. Miller's warning that your companies should have ample storage capacity, to enable them to meet such shortages in coal supply as bitter experience has taught us are to be, from time to time, expected.

The labor problem, which is always with us, and never permanently solved, has forced itself on the attention of some gas managers during the past few years in a way almost unprecedented in the gas industry. As Mr. Miller points out, it is the duty of every manager of a gas property to so arrange that there shall be no interruption in the supply of his commodity through disputes with his workmen. How he can best do this without discriminating against any competent man is a question for local solution. We believe that such fair treatment as your good sense and good hearts will prompt you to extend to each of your employees will, in the future as in the past, save you from the threat of serious trouble with those who are doing the manual work connected with the conduct of your industry, and neutralize the effect of the demagogues' efforts to persuade them to disturbance.

What your President says of carbonizing apparatus and machinery is of great interest. The dispute between the advocates of inclined retorts, and of horizontal retorts operated by machinery, is not, by any means, settled. It is to be hoped that someone competent to the task will present to the Association, in 1904, an exhaustive paper upon this subject. Progress is being made every year, and it is the duty of the Council of the American Gas Light Association to insure that this progress is noted on the minutes of our annual meetings.

Inttmately connected with this question are the claims put forth by the advocates of the by-product coke oven. It is not, we believe, claimed by the coke oven people that the ovens are economically applicable to all situations, but it is claimed by them, with confidence, that there are situations in which it is to the advantage of gas companies to operate coke ovens for the production of gas and coke. Your Committee believes that a paper on this subject would be of great value.

Your Committee congratulates you and the industry in general that Mr. Miller has been able to record the fact that the gas business is at last keeping abreast of other manufacturing interests, in the attention which is being given to the use of labor saving machinery and to the design of apparatus, and that the old standards, which for a generation were deemed good enough, have met the necessity of justifying themselves.

Mr. Miller presents a very encouraging statement of the percentage efficiencies of different sources of illumination, showing that gas has a very low percentage efficiency. With the knowledge that it nevertheless competes successfully with electric lamps of much higher efficiency we may look with confidence to the future, and congratulate ourselves that on this point the margin for improvement in gas lighting is much broader than the margin for the improvement in electric lighting.

Your Committee agrees with Mr. Miller that there is a sacrifice of light distribution in the cluster burners known as "gas arcs," but cannot agree with him that, therefore, the use of "gas arcs" should be discouraged. This is a matter in which there may reasonably be a difference of opinion. Your Committee hopes that this question may be thoroughly discussed at this meeting, and to that end has inserted a question in the Question Box asking for a statement of experience in the use of the "gas arcs." To the mind of the Committee, it does not follow that, because the three or four. Welsbach lights used in a "gas arc" do not distribute light as uniformly throughout the space illuminated as would the same number of Welsbach lights separated to a greater distance from each other, there are no advantages in the use of the "gas arc." Your Committee, as stated above, hopes to hear this matter thoroughly discussed.

Your Committee heartily indorses Mr. Miller's defence of gas of high heating efficiency. It would require very decided advantages in the cost of production to persuade the men in charge of the gas industry that they should reduce the calorific value of the gas they supply.

The question of papers and discussions is again brought to the front by Mr. Miller's address. This Association may reasonably be arraigned by its friends for the indifference of its members to the preparation of papers and discussions thereon. The figures given by Mr. Miller, showing the percentage of speakers to attendants, are instructive and mortifying. Something should be done to improve the existing condition. Under our form of government the Council is responsible for the management of the affairs of the Association, except when relieved by your refusal to indorse its recommendations. Its duty is to utilize the intelligence of the membership, to the end that our meetings may be as instructive as our abilities make possible. We recommend that you approve Mr. Miller's suggestion that the duty of obtaining papers and discussions be delegated to the Council of the Association, it being left to the Council to determine whether or not it will work through a committee.

Your Committee would comment at length on the Gas Educational Class, referred to by Mr. Miller, were it not that this matter has been fully covered in the paper presented by Mr. Alex. C. Humphreys and in the discussion that followed. Your Committee fails to understand the indifference of the members of this Association in the matter of standard street main fittings, and regrets, with the President, that this indifference exists. It seems to us useless to advance any arguments in the matter. You all know of these standards—you have had them prepared, and if you don't use them it must be, as the President suggests, because the dime and ease of the moment appear to you of more importance than the dollar and comfort of the future. At least one large gas interest uses standard fittings and pipes and believes it profits thereby. Your Committee believes you would all profit by a similar course. With the fate of the standard fitting movement in mind, we fear it may be useless to urge you to the adoption of the system of accounts proposed and issued during the past year by your Committee on Uniform Accounts. Nevertheless we add the weight of our commendation to the President's strong indorsement of the system, and we hope with him that its general adoption will be accomplished in the near future.

We congratulate you on the character and the quality of the Presidential address upon which we have the honor to report.

This report is unanimous, except that Mr. Morris dissents from the expressions relative to gas arcs.

W. CULLEN MORRIS,
IRVIN BUTTERWORTH,
WALTON CLARK,
} Committee.

Discussion.

Mr. J. H. Keppelman (Reading, Pa.) moved the acceptance of the report.

Mr. Littlehales (Syracuse, N. Y.), in seconding the motion, said he wished to ask whether it was the intention to limit the papers which were to be read at the meeting to those approved by the Council. He wanted this made clear; for if there were any such plan he considered it an utter mistake.

Mr. Clark explained that it was simply an effort to get the aid of a greater number of men in procuring papers. Even now the Council acted as a board of *censors* on all papers read.

Mr. Littlehales inquired if it was the intention of the resolution to limit the papers to such as might be offered by the Council's invited members, or were all the members privileged to volunteer the contributions. He wanted this understood before the question was put.

The President said the object was not to limit the number of papers but to get more. It was assumed that the more who were trying to get papers the greater would be the number of papers obtained. Those who had the matter in charge would certainly welcome suggestions.

The motion to adopt was indorsed.

NEXT PLACE OF MEETING.

The Committee to name the next place of meeting submitted the following report:

To the President and Members of the American Gas Light Association: Your Committee appointed to recommend a place for holding the next annual meeting would report as follows:

The present meeting being held in the West, the Association would in the natural course hold its next convention in the East. The Committee, therefore, had in mind to recommend the city of Washington, but noting that some of the members of the Association are desirous of having the 1904 meeting held in St. Louis, on account of the Exposition to be held there next year, the Committee has decided to recommend that the meeting be held at Washington or St. Louis, and will ask the convention to make choice between the two cities.

On the one hand the Exposition which will be held at St. Louis is planned on such large lines that it is sure to be of interest to all, and the Association has invitations from the Mayor of the city, the President of the Exposition and others to hold the 1904 convention in that city. On the other hand it must be difficult to provide proper hotel accomodations for the members at reasonable rates in St. Louis next Fall, whereas in Washington the hotel accommodations are ample and the rates are reasonable at the time of year when our meeting is held. Washington is always a popular place for holding our meetings, and it is fair to assume that the work of the Convention would pass off better away from the attractions of the Exposition.

With these points in mind the Committee will ask the Association to make choice between the two cities.

C. J. R. HUMPHREYS,
WALTON CLARK,
E. G. COWDERY,
} Committee.

Discussion.

Mr. Keppelman moved the acceptance of the report and the President asked for discussion thereon.

Mr. D. R. Russell, of St. Louis, said he hoped the meeting would be held in that city.. He had reason for thinking there would be not far from a dozen hotels, which would accommodate the members of the Association, about the Exposition grounds. If the members were to send for accommodations in a body they could get special rates, and easily a meeting place. Washington he considered a place with too many distractions. He insisted further that as this was not a local but a National Association, there were too many meetings held in the East. If more meetings were held in the West, western men would join and thus the Association would be made truly national in character. St. Louis would surely give a hearty welcome.

Mr. Thos. D. Miller (New Orleans) said the Association was a democratic body, to be ruled by the majority. He said that in his opinion everyone who had considered the matter recognized that the next meeting should be held in St. Louis. Even if the objection to time and place were valid as to the past, such past was no criterion for the future. The Gas Congress in Paris was not made a failure by the fact of the Exposition. No good reason had yet been offered against St. Louis and he was in its favor.

Mr. H. L. Doherty (N. Y.) was against the St. Louis project and strongly in favor of Washington.

Mr. Forstall said the whole question was the purpose of the meeting. If such were the discussion of technical matters, St. Louis, as the Chicago meeting proved, would not fill the bill. It was Exposition or success from the Society's technical viewpoint. He said, of course, the members would choose.

Mr. Littlehales proposed a ballot by mail to cover all the membership, as only a small part were present.

Mr. Walton Clark reminded the members that a motion was before them, and called for question.

Mr. E. G. Cowdery also advocated that the meeting should be held in St. Louis, reminding the members that they had in the present an unusual opportunity; that $200,000 had been set aside for lectures for the instruction and entertainment of visitors. No doubt they could so manage the business as to have a paper interesting to all delivered during the meeting.

The question was decided in favor of Washington by 57 to 41, on a standing vote, Mr. Butterworth and Mr. Douglass acting as the tellers.

The President then introduced Prof. A. H. White, of the University of Michigan, who gave a most entertaining lecture on

DIFFERENT GASES IN GAS ENGINES.

[For the text of Prof. White's paper, see JOURNAL, Nov. 16th, page 762.]

Discussion.

The President, in inviting discussion on the lecture, complimented the Professor on the clever way in which he put the subject before his hearers.

Mr. Forstall drew attention to the Professor's statement that the efficiency of blast furnace gas, as compared with water gas, was that it could be compressed to a higher temperature. This was extra work which was not clearly accounted for.

Prof. White stated he explained that in his paper. As long as the actual gas engine was running there was loss of work from compressing the gas, but if it be considered that there is no loss of heat in compressing air or gas, which expands again, one would see that you get all the work back. If the heat were removed by a water jacket there would be a loss of heat. If the gas were compressed 10 atmospheres and the explosion produced 7, there would be 17 in the cylinder, of which only 7 would be due to the explosion of the compressed charge.

Mr. W. C. Morris (Long Island City, N.Y.), said that if he understood aright only the blast furnace gas was compressed; the water gas was not. Thus he would like to know if such compression were used with the water gas would not its efficiency also increase?

Prof. White said the efficiency would rise. If the pressure were increased to 5 atmospheres the explosion prssure would, he thought, go near to 9 atmospheres.

Mr. H. L. Doherty (New York), wished to congratulate the Association on taking up a matter which he believed to be of the greatest practical importance in gas engineering. He had the uttermost faith in the gas engine, he said, and that at Madison, Wis., was a central electric station generating half its current by the use of gas engines. Another at Long Branch, N. J., did the same. At Long Branch it was intended to use producer gas and producer gas engines. His opinion was that the makers were ready to guarantee 1-brake horse power per pound of coal per hour. He further drew attention to the value, 111 B.T.U., given to blast furnace gas, which would mean a practical freedom from carbon dioxide. The Koerting engines at the Lackawanna Steel Works get gas of about 18 B.T.U. per cubic foot, and it is hardly reasonable to suppose that the blast furnace gas would contain more than 70 B.T.U., and it might run as low as 50 B.T.U. He reasoned thus they would force the blast to the limit of endangering the charge from free oxygen. He stated further Mr. Donald McDonald compliments Mr. White on his curves. "He says that the indicator obtained resembles a mule kicking up behind." Mr. Doherty also said he could not verify Prof. White's figures and that he was "rather surprised at the figures put upon the blackboard, and was a little surprised at the statement of increased temperature due to adiabatic compression to 10 atmospheres." Further, he called attention to the work of Mr. N. H. Humphrys, of England. He thought it would be well for all interested to look up this paper, as the text books are behind the times. He had understood that attempts were being made to work 100-horse power engines on crude oil, but that the effort was not a success, He was very sorry Prof. White had not taken up the limitation of temperature by the lubrication, and show why we had found the gas engine a machine of such marvellous potentiality, which it would not be, he thought, were such limitation a fact. He seemed to think, "But we can retain a hot core of gas in the center of the cylinder, and we cannot do it with steam, for as soon as the steam condenses the hot core goes to the cylinder walls. Owing to this greater possibility of usefulness gas men should be more interested in gas engines than they are."

(To be Continued.)

Heating by Gas.

By "H. A."

In your issue for October 26th last is an article on "Heating with Oils and Manufactured Gas." It was reprinted from the *Florists' Exchange*, and was written by Mr. B. T. Galloway, Chief of the Bureau of Plant Industry, U. S. Department of Agriculture. In the article the statement is made that a room 16 feet by 18 feet by 8 feet high, can be heated during the coldest weather with a gas consumption of 6½ cubic feet per hour. The room experimented on was in a frame house, exposed on three sides, and contained five large windows. During the test the outside air was at times in the neighborhood of zero F., while that in the room varied from 66° to 70° F. The heating was done by hot water radiation. Mr. Galloway is not known in the gas business, and his unsupported statement would have little weight; but when we find such inquiries as those Mr. E. G. Cowdery is making indorsing practically the same statement, the subject seems to demand some investigation. During the time of Mr. Cowdery's connection with the Milwaukee Gas Light Company a small pamphlet, entitled "Facts Relating to the Use of Gas," was issued by the Company, in which the following statements are made: "Through a long series of experiments on a practical scale, heating three dwellings during winter weather * * * under conditions that pertain to the modern dwelling * * * it requires $\frac{7}{10}$ of a cubic foot of gas per hour for every 10,000 cubic feet of space per degree of difference between the inside and outside temperature."

The experiments were continued over 4 years, and pointed to hot water circulation as the most desirable.

Comparing these figures with Mr. Galloway's results, and assuming the average difference of inside and outside temperatures to be 40° F., Mr. Galloway's room, according to the Milwaukee figures, would require the same amount of gas, or 6½ cubic feet per hour. The same general claims were made for the Backus heater, and in some cases, during the early years of its introduction, they seemed to be substantiated.

I know by personal experience that the average temperature of the Galloway room would be nearly freezing if heated only by an open flame burner, using 6½ cubic feet per hour, and that in a cold house, where the room received no heat from adjoining walls, floors or ceilings, it would require at least 25 cubic feet per hour to maintain the temperature 40 degrees above the external.

The only conclusion to be drawn from the above statement is that some mysterious influence exists in hot water heating and radiation; but as there is no doubt that the combustion in the open flames is complete, and that all the heat of the products of combustion is retained in the room we are forced to the conclusion that the hot water radiator *creates* heat.

It would be interesting to know if the Milwaukee Company still re-

tains the position taken by it three years ago, for it is most desirable that we should not fool ourselves regarding the benefits of gas heating when applied to the production of hot air.

American Central Electric Station Statistics.—No. II.[1]

The bulletin is, indeed, a most interesting and suggestive document, its 51 tables covering every branch of the electric light and power industry. The previous quotations dealt with the gross figures, the distribution of the stations, and the great gain exhibited by the industry as compared with gas. One may now take up some of the other items brought to account. The first of these deals with the capital account.

Of the 2,049 central electric stations operated under private ownership and controlled by corporations, 747 are operated in connection with gas plants, water works or other industries. In such cases the capital stock and bonds, as a rule, cover the entire interests of the corporation, there being no separate issue for the electric station. This is especially true of a corporation which was originally chartered for the manufacture of gas or the operation of water works, and made no additional issue of stock when the electric station was established. Under these conditions it is impossible to obtain an accurate enumeration of the capital stock or funded debt for electric stations exclusively, and the amounts charged to such stations are estimated. These estimates are based largely upon the income derived from the electric stations as compared with the total income of all interests covered by the capital stock and bonds. The capital stock and bonds reported, therefore, may be accepted as representing the capitalization of the central electric stations. The totals for the United States are summarized in the following table:

Capital Stock and Funded Debt—Incorporated Companies: 1902.

Total capital stock and funded debt authorized....	$743,296,266
Total capital stock and funded debt issued.....	627,515,875
Capital stock—	
Authorized.....	435,178,372
Issued.....	372,951,952
Dividends.....	6,189,837
Funded debt—	
Authorized.....	308,117,894
Outstanding.....	254,563,923
Interest	12,118,740

Capital stock constituted 58.5 per cent. of the total authorized capitalization of the stations operated by incorporated companies, and bonds or funded debt 41.5 per cent. Of the total authorized capital stock $372,951,952, or 85.7 per cent., had been issued and was outstanding at the end of the year covered by the report. Of this amount, $23,871,671, or 6.4 per cent., was preferred stock, and $349,080.281, or 93.6 per cent. common stock. The common stock on which dividends were paid during the year amounted to $126,284,352, or 36.2 per cent. of the total issued. This represents an average rate of 4.4 per cent. on all the common stock which paid dividends. Of the total preferred stock, $12,197,463, or 51.1 per cent. of the amount issued, paid dividends, the average rate being 5.2 per cent. There were, therefore, $222,795,929 of common and $11,674,208 of preferred stock on which no dividends were paid. Only 589 companies reported that dividends were paid on either common or preferred stock. There were 71 companies that reported an issue of preferred stock, and 41 that paid dividends on such stock, while 561 paid dividends on common stock and only 13 paid dividends on both common and preferred stock. Of the 2,049 incorporated companies, 795 paid interest on their bonded indebtedness. The amount of this indebtedness was $250,535,749, and the interest paid was equivalent to an average rate of 4.8 per cent. There were 656 municipal stations that reported an issue of bonds amounting to $11,609,488, and 635 reported that interest amounting to $504,805 was paid on bonds to the value of $11,239,588, or an average of 4.5 per cent. on all bonds paying interest. The manner in which the expenses are divided up is shown by the following table:

Expenses—Private and Municipal Stations, and Percentage Each Class is of Total: 1902.

Items.	Total.	Private Stations. Amount.	Private Stations. Per Cent.	Municipal Stations. Amount	Municipal Stations. Per Cent.
Total	$68,081,375	$62,835,388	92.3	$5,245,987	7.7
Salaries and wages..	$20,646,692	$18,766,970	90.0	$1,879,722	9.1
Supplies, materials and fuel.....	22,915,932	20,493,641	89.4	2,422,291	10.6
Rents, taxes, insurance and miscellaneous	11,895,206	11,456,037	96.3	439,169	3.7
Interest on bonds...	12,623,545	12,118,740	96.0	504,805	4.0

The following table gives an idea of how the supply expenditures are divided up:

Supplies and Materials—Private and Municipal Stations and Percentage Each Class is of Total: 1902.

Items.	Total.	Private Stations.	Municipal Stations.	Private Stations. Per Cent.	Municipal Stations. Per Cent.
Total cost.....	$11,280,423	$10,303,956	$976,467	91.3	8.7
Meters—					
Number.....	27,632	25,739	1,893	93.1	6.9
Cost	$416,994	$390,569	$26,425	93.7	6.3
Motors—					
Number.....	602	572	30	95.0	5.0
Cost.....	$30,099	$29,202	$897	97.0	3.0
Transformers—					
Number.....	13,288	7,843	5,445	59.0	41.0
Cost.....	$365,028	$326,407	$38,621	89.4	10.6
Incandescent lamps—					
Number.....	8,839,905	8,399,571	440,334	95.0	5.0
Cost.	$1,507,249	$1,426,224	$81,025	94.6	5.4
Incandesc'nt lamp fittings, sockets, cost.	$177,236	$154,517	$22,719	87.2	12.8
Carbons for arc lamps—					
Number.....	94,686,596	82,156,930	12,529,666	86.8	13.2
Cost.....	$1,051,386	$900,788	$150,598	85.7	14.3
Globes for arc lamps—					
Number.....	485,073	428,979	57,094	88.4	11.6
Cost.....	$170,929	$150,509	$20,420	88.1	11.9
Arc lamps, repairs, cost.....	224,537	212,231	32,306	86.8	13.2
Poles or other supports, cost.....	346,587	319,617	26,970	92.2	7.8
Wire and cable, cost	1,152,915	1,081,380	71,535	93.8	6.2
Mill supplies (oil, waste, etc.), cost..	712,797	617,911	94,886	86.7	13.3
Power purchased, cost.....	2,130,759	2,007,193	123,566	94.2	5.8
Freight paid, not included in other items.....	1,120,363	939,512	180,851	83.9	16.1
All other materials, cost.....	1,853,544	1,747,896	105,648	94.3	5.7

The gross annuul income for both private and municipal stations amounted to $85,700,605, and the expenses, including interest on bonds, to $68,081,375. Deducting the expenses from the income leaves an apparent net income of $17,619,230, but this amount should not be accepted as the actual net income, because the methods of bookkeeping in use by a number of the central electric stations and the manner of carrying on their business made it impossible to obtain the information necessary to prepare a true income account for the generation and sale of electric current exclusively. For instance, the income from "all other sources" includes amounts derived from wiring houses, sales of lamps, wires and other supplies. In some cases, the stations do considerable mercantile business of this character, but it is impossible to segregate the expenditure so as to show the cost of supplies used, as distinct from those sold. The reports for 380 stations show that free service of some character was furnished to the municipalities in which they are located. This free service consisted of lighting part or all of the public buildings, furnishing a certain number of lamps, or making a discount on the lamps used by the the city. Where free service was given, its value was estimated at commercial rates and included in the income. Eighty-nine stations reported that a cash compensation was required for the franchise privilege or that a certain specified amount of percentage of the gross income was required to be paid yearly. In a few cases the stations were required to pay a special tax. All of these amounts have been included in the total expenses shown.

As to the income, incandescent lighting is a much more important source of income than arc lighting for stations operated under private

[1] For No. I., *ante*, p. 931.

ownership, but for municipal stations these two sources of income are of nearly equal importance. Of the total, $70,138,147, reported as the income from lighting for both private and municipal stations, $50,368,173, or 71.8 per cent., was derived from lighting private dwellings, office buildings, or other business properties, and $19,769,974, or 28.2 per cent., from lighting streets, parks and public buildings. Of the total amount, $25,481,045, reported as income from arc lighting, $8,460,320, or 33.2 per cent., was from lighting commercial or other private properties, and $17,020,725, or 66.8 per cent., from lighting public places; and of the $44,657.102, reported from incandescent lighting, $47,907,853, or 93.8 per cent., was from commercial or other private use, and $2,749,249, or 6.2 per cent., was from public lighting.

There are 136 stations that report the purchase of electric current costing $1,300,925; 71, the purchase of water power costing $210,619; 95, the purchase of steam power costing $296,831; and one, the purchase of power generated by gasoline engines costing $240. There are 85 stations which rent the use of water for the operation of water wheels, paying $322,144 for the same, and a number report amounts aggregating $460,011 as paid for water to generate steam.

The totals given in the table below show the cost of the various kinds of fuel consumed in each class of stations:

Cost of Fuel—Private and Municipal Stations, and Percentage each Class is of Total: 1902.

Items.	Total.	Private Stations. Amount.	Private Stations. Per Cent	Municipal Stations. Amount.	Municipal Stations. Per Cent
Total.....	$11,635,509	$10,189,685	87.6	$1,445,824	12.4
Coal	9,943,125	8,749,394	88.0	1,193,731	12.0
Crude petroleum.	721,838	700,136	97.0	21,702	3.0
Natural gas	254,269	220,460	86.7	33,809	13.3
Artificial gas	28,654	20,135	70.3	8,519	29.7
Other fuel.....	687,623	499,560	72.7	188,063	27.3

The prominence of crude petroleum will be noted, but its consumption was localized, $515,820 being the value of that used in California and $128,087 being the value of that used in Texas.

The pay roll is, of course, a large item. There are 6,996 salaried officials and clerks employed by the central electric stations, receiving $5,663,580 as salaries. Of this number 3,016, or 43.1 per cent., are clerks, who receive $1,716,831, or 30.3 per cent. of the total salaries. The stations operated under private ownership employ 6,046 officials and clerks, or 86.4 per cent. of the total, and those under municipal control, 950, or 13.6 per cent. The salaries paid in the private stations amount to $5,206,199, or 91.9 per cent., and in the municipal stations to $457,381, or 8.1 per cent. of the total. The stations operated under private ownership give employment to 91.3 per cent. of the total number of clerks and pay 96.2 per cent. of the total salaries paid to clerks, as compared with 8.7 and 3.8 per cent., respectively, for municipal stations.

The table below summarizes the totals for the average number and total wages of wage earners reported for both private and municipal stations and shows the proportion in each class of stations:

Average Number of Wage Earners and Total Wages—Private and Municipal Stations, and Percentage each Class is of Total: 1902.

Occupations.	Total.	Private Stations.	Municipal Stations.	Private Stations. Per Cent.	Municipal Stations Per Cent.
Total—					
Average number.	23,330	20,863	2,467	89.4	10.6
Wages.....	$14,983,112	$13,560,771	$1,422,341	90.5	9.5
Foremen—					
Average number.	1,000	943	57	94.3	5.7
Wages.....	$953,738	$910,972	$42,766	95.5	4.5
Inspectors—					
Average number.	571	546	25	95.6	4.4
Wages.....	$415,904	$397,983	$17,921	95.7	4.3
Engineers—					
Average number.	4,587	3,743	844	81.6	18.4
Wages	$3,259,870	$2,721,127	$538,743	83.5	16.5
Firemen—					
Average number.	3,456	2,951	505	85.4	14.6
Wages	$1,963,465	$1,717,149	$246,316	87.5	12.5
Dynamos and switchboard men—					
Average number.	1,978	1,872	106	94.6	5.4
Wages	$1,351,676	$1,286,065	$65,611	95.1	4.9
Linemen—					
Average number.	4,217	3,868	349	91.7	8.3
Wages	$2,710,841	$2,510,269	$200,572	92.6	7.4
Mechanics—					
Average number.	1,057	1,009	48	95.5	4.5
Wages.	$796,355	$768,694	$27,661	96.5	3.5
Lamp trimmers—					
Average number.	2,637	2,318	319	87.9	12.1
Wages	$1,654,462	$1,460,046	$194,416	88.2	11.8
All other employees—					
Average number.	3,827	3,613	214	94.4	5.6
Wages	$1,876,801	$1,788,466	$88,335	95.3	4.7

As to the wage earners, it appears that for all classes taken together the prevailing rate of wages is from $1.50 to $2.24 per day, 9,783 wage earners, or 51.8 per cent. of the total, being paid at his rate. It appears that 13,489 wage earners, or more than two-thirds of the total number, rec ive from $1.50 to $2.74 per day. More than one-half of the engineers receive from $1.50 to $2.49 per day, and more than one-half of the firemen receive from $1.50 to $2.24 per day.

[Concluded from Page 927.]

Rules for the Specification of the Ironwork of Gasholders.—German Standards.

APPENDIX.

TABLE I.—*Particulars of 39 Sizes of Holders.*

[Approximate English equivalents added on the assumption that 1 meter = 40 inches, instead of 39 371 inches, or 3 feet 3⅜ inches nearly. The round figures in feet and inches show the principle on which the table is drawn up more clearly than the exact decimal equivalents would do; but they are too high by about 1 in 64, or 1½ per cent.]

Capacity.		Diameter Outlet Pipe.		Diameter of Bell.		Diameter Fir t Lift.		Diameter Second Lift.		Height of E.ch Lift.	
Cubic Meters.	Thousands Cubic Feet.	Millimeters.	Inches (nearly).	Meters.	Feet and Inches (nearly).	Meters.	Feet and Inches (nearly).	Meters.	Feet and Inches (nearly).	Meters.	Feet and Inches (nearly).
					Ft. In.		Ft. In.		Ft. In.		Ft. In.
400	14.126	150	6	11.0	36 8	..	.....	..	.....	4.31	14 4
450	15.892	175	7	11.5	38 4	..	. . .	..	. . .	4.43	14 9
500	17.658	175	7	12.0	40 0	..	.....	..	.....	4.52	15 0
600	21.189	200	8	12.5	41 8	..	.....	..	.....	4.99	16 8
700	24.721	200	8	13.0	43 4	..	.....	..	.....	5.37	17 11
800	28.252	200	8	13.5	45 0	..	.....	..	.....	5.69	19 7
900	31.784	200	8	14.5	48 4	..	. ....	..	.....	5.55	18 6
1,000	35.31	225	9	12.0	40 0	12.5	41 8	..	.....	4.44	14 7
1,200	42.37	225	9	12.5	41 8	13.0	43 4		.....	4.90	16 4
1,400	49.44	250	10	13.0	43 4	13.5	45 0	..	.....	5.28	17 7
1,600	56.50	250	10	13.5	45 0	14.0	46 8	..	.....	5.59	18 7
1,800	63.57	275	11	14.5	48 4	15.0	50 0	..	.....	5.47	18 3
2,000	70.63	300	12	15.0	50 0	15.6	52 0	..	.....	5.65	18 10
2,200	77.69	300	12	15.6	52 0	16.2	54 0	..	.....	5.75	19 2
2,500	88.29	325	13	16.2	54 0	16.8	56 0	..	.....	6.05	20 2
2,700	95.35	325	13	16.8	56 0	17.4	58 0	..	.....	6.08	20 3
3,000	105.9	350	14	14.5	58 4	15.0	50 0	15.6	52 0	5.94	19 9
3,500	123.6	350	14	15.6	52 0	16.2	54 0	16.8	56 0	5.97	19 11
4,000	141.3	375	15	16.2	54 0	16.8	56 0	17.4	58 0	6.32	21 0
4,500	158.9	400	16	16.8	56 0	17.4	48 0	18.0	60 0	6.61	22 0
5,000	176.6	400	16	17.4	58 0	18.0	60 0	18.6	62 0	6.85	22 10
6,000	211.9	425	17	18.6	62 0	19.2	64 0	19.8	66 0	7.21	24 0
7,000	247.2	450	18	19.8	66 0	20.4	68 0	21.0	70 0	7.44	24 8
8,000	282.5	475	19	21.7	72 4	22.4	74 8	23.1	77 0	7.10	23 10
9,000	317.8	500	20	22.4	74 8	23.1	77 0	23.8	79 4	7 48	24 9
10,000	353.1	550	22	23.8	79 4	24.5	81 8	25.2	84 0	7.41	24 7
12,000	423.8	600	24	25.9	86 4	26.6	88 8	27.3	91 0	7.54	25 1
14,000	494.4	600	24	28.0	93 4	28.7	95 8	29.4	98 0	7.55	25 2
16,000	565.0	650	26	30.1	100 4	30.8	102 8	31.5	105 0	7.50	25 0
18,000	635.7	650	26	31.5	105 0	32.3	107 8	33.1	110 4	7.70	25 8
20,000	706.3	700	28	33.1	110 4	33.9	113 0	34.7	115 8	7.76	25 10
22,000	776.9	750	30	34.7	115 8	35.5	118 4	36.3	121 0	7.78	25 11
25,000	882.9	750	30	36.3	121 0	37.1	123 8	37.9	126 4	8.08	26 11
27,000	953.5	800	32	37.1	123 8	37.9	126 4	38.7	129 0	8.35	27 10
30,000	1059	800	32	39.5	131 8	40.3	134 4	41.1	137 0	8.19	27 3
35,000	1236	900	36	41.9	139 8	42.7	142 4	43.5	145 0	8.52	28 4
40,000	1413	900	36	45.1	150 4	45.9	153 0	46.7	155 8	8.43	28 1
45,000	1589	1,000	40	47.5	158 4	48.3	161 0	49.1	163 8	8.56	28 6
50,000	1765	1,000	40	50.7	169 0	51.5	171 8	52.3	174 4	8.37	27 11

TABLE II.—*Details of 62 Sizes of Bells or Lifts.*

Of these four, those in square brackets are not required in the preceding table, but are entered for convenience.

[English approximate measurements only given here, on the assumption that 1 inch = $\frac{1}{40}$ meter.]

Diameter of Bell or Lift.			Sheets, Lbs. per Square Foot.	Radius of Dome, Inches.	Crown Sheets Lbs. per Square Foot.	Number of Guide Columns.	Depth of Cups.		Thickness of Cup Sheets. Inches.	Superelevation of Cup Sheets. Inches.	Stiffening-iron of Cup Walls. Inches.	Angle Iron for the Top Curb, the Section of which is to be Increased by Joining Plate on. Inches.		
Meters.	Feet and Inches (nearly).						2-Lift. Inches.	3-Lift. Inches.						
	Ft.	In.												
11.0	36	8	3.27	800	3.27	8	12	..	0.16	3.2	1.6 × 0.32	2.0	2.0	0.36
11.5	38	4	"	"	"	"	"	..	"	"	"	"	"	"
12.0	40	0	"	"	"	"	"	..	"	"	"	"	"	"
12.5	41	8	"	1,000	"	"	"	..	"	"	"	2.6	2.6	0.44
13.0	43	4	"	"	"	"	"	..	"	"	"	"	"	"
13.5	45	0	"	"	"	"	"	..	"	"	"	"	"	"
14.0	46	8	"	"	"	"	"	..	"	"	"	"	"	"
14.5	48	4	"	"	"	"	"	..	"	"	"	"	"	"
15.0	50	0	"	1,200	3.47	"	"	..	"	"	"	"	"	"
15.6	52	0	"	"	"	"	14	16	0.20	"	"	"	"	"
16.2	54	0	"	"	"	"	"	"	"	"	"	"	"	"
16.8	56	0	"	"	"	"	"	"	"	"	"	"	"	"
17.4	58	0	"	1,400	3.78	"	"	"	"	"	"	3.2	3.2	0.48
18.0	60	0	3.47	"	"	"	"	"	"	"	"	"	"	"
18.6	62	0	"	"	"	"	"	"	"	"	"	"	"	"
19.2	64	0	"	"	"	"	"	"	"	"	"	"	"	"
19.8	66	0	"	1,600	"	"	"	"	"	"	"	"	"	"
20.4	68	0	"	"	"	"	"	"	"	4.0	2.0 × 0.4	"	"	"
21.0	70	0	"	"	"	"	"	"	"	"	"	"	"	"
21.7	72	4	"	"	"	10	16	18	0.24	"	"	"	"	"
22.4	74	8	"	1,800	"	"	"	"	"	"	"	"	"	"
23.1	77	0	"	"	"	"	"	"	"	"	"	"	"	"
23.8	79	4	"	"	"	"	"	"	"	"	"	"	"	"
24.5	81	8	"	2,000	4.09	"	"	"	"	"	"	4.0	4.0	0.56
25.2	84	0	"	"	"	"	"	"	"	"	"	"	"	"
25.9	86	4	"	"	"	"	"	"	"	"	"	"	"	"
26.6	88	8	"	"	"	"	"	"	"	"	"	"	"	"
27.3	91	0	3.78	"	"	12	"	"	"	"	"	"	"	"
28.0	93	4	"	"	"	"	"	"	"	"	"	"	"	"
28.7	95	4	"	"	"	"	"	"	"	"	"	"	"	"
29.4	98	0	"	2,400	"	"	"	"	"	"	"	"	"	"
30.1	100	4	"	"	"	"	"	"	"	"	"	"	"	"
30.8	102	8	"	"	"	"	"	"	"	"	"	"	"	"
31.5	105	0	"	"	"	"	"	"	"	"	"	"	"	"
32.3	107	8	"	"	"	14	18	20	0.28	"	"	"	"	"
33.1	110	4	"	"	"	"	"	"	"	"	"	"	"	"
33.9	113	0	"	"	"	"	"	"	"	"	"	"	"	"
34.7	115	8	"	2,800	4.49	"	"	"	"	"	"	5.2	5.2	0.64
35.5	118	4	"	"	"	"	"	"	"	"	"	"	"	"
36.3	121	0	"	"	"	"	"	"	"	"	"	"	"	"
37.1	123	8	"	"	"	"	"	"	"	"	"	"	"	"
37.9	126	4	"	"	"	16	"	"	"	"	"	"	"	"
38.7	129	0	"	"	"	"	"	"	"	"	"	"	"	"
39.5	131	8	"	3,200	"	"	"	"	"	"	"	"	"	"
40.3	134	4	"	"	"	"	"	"	"	"	"	"	"	"
41.1	137	0	"	"	"	"	"	"	"	"	"	"	"	"
41.9	139	8	"	"	"	"	"	"	"	"	"	"	"	"
42.7	142	4	"	"	"	"	"	"	"	"	"	"	"	"
43.5	145	0	"	"	"	"	"	"	"	"	"	"	"	"
[44.3	147	8]	"	3,600	4.90	18	"	"	"	"	"	"	"	"
45.1	150	4	"	"	"	"	"	"	"	"	"	"	"	"
45.9	153	0	"	"	"	"	"	"	"	"	"	"	"	"
46.7	155	8	"	"	"	"	"	"	"	"	"	"	"	"
47.5	158	4	"	"	"	"	"	"	"	"	"	"	"	"
48.3	161	0	"	"	"	"	"	"	"	"	"	"	"	"
49.1	163	8	"	"	"	"	"	"	"	"	"	"	"	"
[49.9	166	4]	"	4,000	"	"	"	"	"	"	"	"	"	"
50.7	169	0	"	"	"	20	"	"	"	"	"	"	"	"
51.5	171	8	"	"	"	"	"	"	"	"	"	"	"	"
52.3	174	4	"	"	"	"	"	"	"	"	"	"	"	"
[53.1	177	0]	"	"	"	"	"	"	"	"	"	"	"	"
[53.9	179	8]	"	"	"	"	"	"	"	"	"	"	"	"

Thickness of rivets for side and crown sheets, 0.24 to 0.32-inch.

Distance between rivets for the same, 1 to 1.2-inch.

Lap of riveted sheets, 1 to 1.2-inch.

The joints of the angle irons of the crown curb ring, the cups and the foot rings are not to coincide with the angles of the polygon of the holder, and are also not to stand at equal distances from these.

The joints of the sheets are not to coincide with the polygonal divisions of the holder, and are not to break joint with reference to one another; rather should the vertical riveted seams run straight down the whole depth at points in the circumference where they are not covered by other parts of the construction.

The top sheets to be arranged in concentric rings and reduced in radial directions. The lap of the concentric seams to be directed outwards on the upper surface.

Supports, at least 4 inches high, to be provided and fixed on the bottom of the tank.

The bell to sink 6 inches below the level of the top of the tank for a 1-lift holder, 6.8 inches for a 2-lift, and 8 inches for a 3-lift holder.

Notes.—After deliberation, it was decided to specify only one holder for each normal capacity. This renders it possible to build holders for different pressures by selecting the normal diameter for the capacity required and varying only the height of the holder according to the pressure to be employed. The committee started with only 14 standard diameters, but it was found that the differences were too great. The series above given has differences ranging between 9.3 and 3 per cent.; and any required modifications in the height, to suit varying pressures, are confined within these limits, which practically make no difference in the forces to be dealt with or in the constructional detail.

In Table I., one holder is shown for each capacity, from 400 to 50,000 cubic meters (14,126 to 1,765,000 cubic feet). Altogether, in the 39 holders, there are 58 diameters constructionally involved; and of the 39 holders, 7 are single-lift, 9 2-lift, and 23 3-lift. Independent specifications of these would have resulted in 94 different diameters. The 3-lift holders and the 2-lift holders can be reduced to smaller capacities by omitting an outer lift or lifts. The diameters have been chosen with a view to allowing enough space for the angle iron in the framework of the bell and for riveting the cups, to prevent rubbing, to limiting the quantity of water in the cups, and to keeping down the number of sizes of iron necessary.

The number of guide columns is adjusted so as to limit the area of the bell which may come to depend upon any given column.

The depth of the cups is made to correspond with the diameter of the bell.

The thickness of the sheets is adjusted according to experience. The greatest tension at 8 inches pressure is only about 3,408 pounds per square inch; and this, allowing a factor of 0.6, corresponds to a pull of 5,700 pounds per square inch along the seams. The thickness of the top sheets is adjusted so as to make the sectional pull upon them about the same.

As to whether a flatter or a taller dome is desirable, we may compare two cases; in the one the radius of curvature is 2.04 times, in the other it is 1.66 times the diameter of the dome. The tension in the sheets of the dome is proportional to the radius, and is greater in the flatter dome; and though the steeper dome pulls more directly upwards on the curb than the flatter one does, the product R cos a, to which the upper pull is proportional, remains greater in the flatter dome in the proportion of 1.97778 to 1.58290. The curb ring of the frame must, therefore, be heavier in this proportion; and as this is about 6 per cent. of the whole weight, this will add 1.5 per cent. to the total floating weight. Again, the crown sheets must be made heavier to stand the higher tension, and though their area is a little less, on the whole the weight of the crown sheets, which amounts to about 10 per cent. of the whole, must be raised by about 21 per cent., that is, 2.1 per cent. of the whole floating weight. Further, the crown framework must, for similar reasons, be, on the whole, raised about 21 per cent., and as this is again about 10 per cent. of the whole, this again adds 2.1 per cent to the total floating weight. The total floating weight is thus higher in the flatter of these two domes by about 5.7 per cent. This proportionately raises the cost and increases the pressure by over 0.4 inch. It has been decided, for constructional reasons, to grade the radius of curvature, and not the actual height of the dome.

The diameter of the outlet pipes is so chosen that when a gas works has two equal holders, either of them acting alone can drive the whole maximum hourly output with a loss of 0.2 inch pressure through 100 meters (328 feet) of main, assuming that the whole storage capacity is 60 per cent. of the maximum daily output.

STANDARD CONTRACT FOR SUPPLY OF A GASHOLDER ACCORDING TO THE FOREGOING SPECIFICATION (1903): (Summary).

Annexes.

1. Plan, 1 : 100 (clause II.).
2. Drawing of heating arrangements (clause II.).
3. Drawing of indicator (clause II.).
4. Ground plan 1 : 1,000 (clause IV.).
5. Copy of standard specification, 1901 (clause VI.).

Clauses.

I. Parties.

II. Gasholder as per annex No. 1 and drawings referred to in clause VIII. To consist of—

1. An ingot iron water tank, diameter, depth at the sides, thickness of sides, thickness of bottom, connecting joints for water inlet and outlet and for the heating arrangements; calculated weight.

2. Gas inlet and outlet pipes per plan, annex 1; internal diameter; calculated weight.

3. Guide frame for tangential (or radial) guiding; number of columns, braced together, footways with hand rails; calculated weight.

4. Steps with hand rails (or ladders); weight.

5. Ingot iron bell, internal diameter, height; hand rails round the crown: manholes with doors; air cock; number of upper and of lower guide rollers; weight of top sheets, weight of side sheets per square meter; calculated weight.

6. Lifts; diameter, height, number of upper and of lower guide rollers. Weight of side sheets and of cup sheets per square meter. Calculated weight.

Price of 1 to 6 to be at uniform specified rate per ton. Incorporation of the conditions of the standard specification, 1901, as to painting. A second coat of red lead to all those parts which will become inaccessible. Paint and luting material to be charged the same price as iron. Further painting not within this contract; nor covering in the tank or the cups, except the ironwork necessary for the latter.

7. Heating arrangements for tank and cups as per annex 2; contract price, £——.

8. Indicator as per annex 3; contract price, £——

III. Available geometric volume when holder at its highest to be so many cubic meters. Content of tank, filled to the overflow, stated. Gas pressure stated, measured at the outer level of the water in tank, when bell settling down and when at its highest.

IV. Position of holder as per annex 4, which shows gas and water pipes to and from the place. Right reserved to alter the ground till work begun, but not so as to influence the construction or the cost of working or of handling the material. If the site is changed the holder shall be put up at the new spot, but the contractor shall be paid for any additional expense this may cause him. Land to be thrown open to contractor at date stated in condition suitable for the work. Works to keep open and maintain in good condition roads and rails for material and work people and clearing away; these specified by reference to plan; roads and ways not to be used for storing anything, and railway regulations to be conformed to by the contractor. If the place is not ready for the contractor, his date of completion is postponed (see Sec. 8, standard specification, 1901). Insurance against fire and explosion at the cost of the gas works as regards objects brought on the ground; and as to those set up, at the cost of the contractor. Contractor to take care against fire and against damage by falling iron, etc.; damages reserved against him.

V. (Iron tank). Gas works to prepare the ground according to plan; to be in good condition, ready for work to begin. Delay in this postpones the date of completion.

(Masonwork or cement tank). To be provided by the gas works. Contractors to provide the needful ironwork for anchoring the guide frame and the tank guide rails and these latter rails also. Gas works puts these in the masonwork at its own risk. Contractor's delay in supplying drawings or ironwork postpones his date of beginning work without affecting his date of completion. Gas works puts in the feet of the columns and builds them down, to the satisfaction and under the control of the contractor. Delay on the part of the gas works postpones the date for completion by the contractor.

VI. Particulars of ironwork as per standard specification of 1901.

VII. Contractor provides everything, except as in Clauses IV. and V. preceding, according to the rules of good construction. He is to bring, at the contract price (Clause II. above), all materials, and to provide all scaffolding, cranes, etc.; and to provide lighting for his work; to keep the place clean; to deliver the holder in perfect working order, to clear away, to restore buildings in order; so that gas works may proceed to use the holder without having to provide anything. All freights and carriage to be paid by the contractor. If the gas works pipes for gas, water and steam (Clause II.) are laid before the holder is complete, the contractor is to connect up with them without charge; if the holder is ready first, the gas works must lay inlet and outlet gas pipes, but only after the tank has been filled.

VIII. Contractor to supply calculations, drawings and quantities without payment, and copies of them within —— weeks of the date of the contract, also without charge. The drawings to correspond to the calculations, and to be on a scale large enough to take measurements off and to show the details of construction and the materials used. Acceptance of the drawings not to free the contractor from responsibility for true measurements and arrangement of all the parts. Pieces more than 5 per cent. weaker than shown in the drawings to be, at gas works' option, rejected, or a reduction made in the price.

IX. Alterations to be made by the contractor only with the express consent of the gas works. Alterations required by the gas works to be made by the contractor; cost to be agreed upon and paid by the works. The drawings left with the works to be amended by the contractor free of charge if alterations made by him in the construction.

X. Contractor to give to the gas works, free of charge, the drawings and calculations necessary for the public inspection of buildings. All responsibility to the public authorities for accuracy and for careful work (including the scaffolding) falls upon the contractor, without relief against the gas works. The contractor undertakes all this responsibility for his staff, assistants and workmen.

XI. Gas works has right to take samples for testing, and to go on the ground and into the workshops of the contractor and his manufacturers to supervise the condition and quality of the material. Samples not to be charged for, and to be supplied and conveyed out of the premises by the contractor. Gas works to pay its representatives' expenses. Bad material or work may be rejected; and may be renewed or replaced at contractor's expense, if contractor does not himself renew or replace within a stated time after one notice.

XII. Construction to be supervised by gas works' representative; contractor not freed from liability by this. Respectful treatment by contractor's employees; contructor to dismiss and replace any disrespectful employee on demand of gas works' representative. Similarly for compliance with regulations of the gas works.

XIII. Date when materials may begin to be brought in; date for completion of gasholder; application of rules of 1901 standard specification, Sec. 8; rainy days on which no work can be done, days of heavy snow and time while snow covers the parts of the holder on the ground, and days of dry frost below —2° C. are cases of causes beyond control within Sec. 8 of the 1901 specification.

XIV. (Iron tanks.) Joint inspection when construction finished; when all parts are approved, tank to be filled by the gas works, at contractor's risk as to ironwork; then filling the holder with gas for testing (Sec. 5 of 1901 specification). Gas works entitled to take the holder into use though not satisfied, reserving its rights.

(Masonwork or cement tanks). Joint inspection as above; gas works promptly to repair all unavoidable injury done during construction to the tank; injury done through fault of contractor's employees to be promptly repaired by contractor without charge. When all parts approved and repairs well set, tank filled, holder filled with gas and tested (1901, Sec. 5).

XV. Holder to be taken over as soon as approved properly made according to the rules of the art and found tight and workable. Bringing it into use, although it be not quite according to contract is not taking it over.

XVI. Contract price. One third when work begun, half when ready for filling the tank, remainder three months after taking over.

Price according to weight of materials brought in and used (1901, Sec. 7); differences between estimate and actual to be accounted for in the last of the three payments. Penalties, advances, carriage, assistance from the gas works to be accounted for in the earlier payments. Gas works to pay current wages, etc., for these at the contractor's request.

XVII. Security; lodged on receipt of the first payment; amount stated; according to 1901, Sec. 9.

XVIII. No assignment of the obligations of the contract without consent of gas works. Gas works entitled to throw up contract immediately on contractors becoming bankrupt.

XIX. Gas works may stop work and delivery of material and may finish the work at contractor's cost so soon as contractor fails to carry out his contract or gets materially into arrear with it. Accounts to be settled in such a case when the holder is ready.

XX. Letters and telegrams relating to this contract and the execution of it, borne by each party. Cost of sending money or anything sent in the interest of the contractor to be borne by contractor. Stamps divided equally. The sum subject to stamp duty is £——, that is £—— in materials to become a fixture and £—— in work.

XXI. Two copies of contract to be signed, one for each party. The approval of the [town council] made a condition on behalf of the gas works.

[Signatures and dates].

Approved.

[Town Council],

Stamp.

Why Corporations and Companies Should Undertake Internal Fitting Work.

[A paper read by MR. A. E. MOTTRAM (Ossett), at the last meeting of the Manchester District Inst. of Gas Engineers.]

The agenda of a gas association meeting does not seem to be complete at the present time unless it contains a paper pointing out one or two ways in which we can increase the number of our consumers; and so it is from this standpoint that I approach my subject. In going about our districts of supply, no doubt we have all been troubled to see two or three houses here, and two or three there, and perhaps a whole row in the next street, looking very dismal and cheerless in the semi-darkness cast around by a fitful tallow candle, or, worse still, by an oil lamp; and if we have taken the trouble to ask why the people do not brighten up their homes—as they can do so cheaply by the aid of incandescent gas burners—the reply we all know so well is that the fittings are bad, or they have no fittings in, and that the landlord will not do anything for them. Cottage property owners in particular are great sinners in this respect. Consequently, it is the working class that suffer most inconvenience. Working men like a good light in their homes; but they strongly object to spend money on gas fittings in other people's property. They are anxious to become gas consumers if the necessary appliances are at hand.

Something Still Wanting.—In my town, slot meters, together with a griller, have been fixed for some years back, for anyone applying for them; but I noticed a great many houses without gas in—pointing to something still wanting. Then a neighboring district council made an agreement with my corporation that we should take the gas into their township, and run a main about a mile long down a certain road by a fixed date. I laid this main, which ran past about 120 houses, and expected to have a fair number of applications for meters. I had only one. The houses had not any fittings in, and no one seemed willing to go to any expense to instal them; and so this main looked like being a dead loss.

I now looked thoroughly into the question of slot fittings, and soon satisfied myself that it would be to the public benefit, and also to the advantage of my works, and that I should not be injuring anyone by lending fittings, and fixing them, with the landlord's consent, for all who were anxious to become gas consumers. When I then laid the matter before my committee, they at once gave me full authority not only to adopt slot fittings for cottage houses, but to undertake other internal fitting work, and also to include incandescent maintenance. I decided to fix free one pendant, or harp light, with incandescent burner, and two brackets, together with a griller or slot cooker; and so distributed illustrated circulars around the district, and also put a large advertisement in the local newspaper. I very quickly had to withdraw this and place in its stead an advertisement for plumbers wanted; the rush of applications for fittings proving the necessity for our undertaking the work.

I would emphasize the importance of lending an incandescent burner. It has brought me scores of consumers. In many cases one tenant in a block of property would apply, the rest holding back to see what sort of light it gave; and when they saw what a splendid light they could have, lasting for five or six hours for a penny, they were quickly converted. In 12 months' time I have increased the number of my consumers by 25 per cent.; and instead of one consumer out of 120 on the road referred to above, I have now 115, and building operations are proceeding briskly.

Another neighboring urban council had been wanting gas in their district for some time; but it was doubtful whether it would pay us to lay the mains. After our internal fitting work proving so successful, however, we offered to lay the pipes if they would adopt the Lighting Act and light up the roads. This they were willing to do, but could not afford, on their small ratal, to pay at one time £300 or £400, the first cost of the lamps. So to get them out of the difficulty, we offered to provide and fix them 100 lamps complete on the hire purchase system—they to pay for them in 10 annual instalments. This was agreed to, and now they are proud of being among the best lighted villages, both inside and out, of any in the country.

We Gain Everything and Lose Nothing.—Referring to my statement that by adopting internal fittings I should benefit the public, benefit my department, and injure no one, I am claiming that we gain everything and lose nothing by it. The enormous demand all over the country for slot fittings points to their being a public benefit; they certainly enable the working classes to participate in the advantages of gas, which previously they have had to look upon as the luxury of their fortunate neighbors with fittings in their houses, or of those who were in a position to dictate "fitting terms" to their landtords. To show that they appreciate them, out of the hundreds I have put in I have not had a single customer fall back again to either electricity, oil, or candles. There are several ways in which we at the same time benefit by this work. We greatly increase our consumption at small cost, we increase our consumers per mile of main, turn many unprofitable streets into good ones, spread good fittings up and down, and advertise a good light in every part of our district. I have never had a single complaint of bad gas where we have put in the fittings.

Plumbers the country over have, I am afraid, claimed that they alone have the sole right to all fitting work beyond the meter. We have only ourselves to blame for this, for letting the work go so long by default; and now when competition is making us look around, we see how much we have been at their mercy, and to what an extent our consumption has been throttled for the want of a little push and attention to this department. In our case, the plumbers have grumbled but little, and chiefly at our selling mantles and globes cheaper than they can; and I see no reason why we should not work very well together. By pushing and extending gas over the district, we have brought a lot of work to them. We, of course, do all work up to the meter; and where we lay a service across private ground, for which we have to charge, if we do it at cost price, or even under, they cannot grumble, as they are not in competition for this part of the work. For fittings we have put in for ordinary meters, however, we have charged a fair trade price; and I fail to see what right the plumbers have to object to us, who have to live by selling our gas, dealing in the articles that enable the public to consume it. Gasfitting is only a small part of the plumber's business, and so long as we keep off the other departments of his trade and hold to our own department, we have nothing to fear.

The houses into which we have put slot fittings have been waiting for twenty years or more for gas. Ample time has therefore been allowed for orders to be given to the plumbers; so I fail to see how we can have robbed them of something they never had. I am sure if they would seek some of this work they would meet with success; and if our competition induces them to reconsider their business methods, we shall have done them good service.

Far Behind the Times.—In a very short time those towns that do not undertake internal fittings will be as far behind the times as those are to-day who do not fix slot meters. Our slot fittings have cost, on the average, 15s. 1d. per house. We have all been satisfied for some time that slot meters are profitable business; and those who have not gone to the extent of putting in fittings will soon see their way to expend a further 15s. 1d., and tap an extensive market for their gas.

We hear sometimes of slot meters not being pushed for fear of the consumers wanting to change from ordinary meters to slots, and, consequently have a lot of ordinary meters thrown on our hands. My predecessor at Ossett, with commendable foresight, lent grillers, etc., with ordinary meters the same as with slots. I have not, therefore, been bothered with a lot of "ordinaries" thrown on my hands. This is, in my opinion, the best cure: Lend free as much as you possibly can to ordinary consumers, then there will be no inducement for them to change to slots.

Specification of House Piping.—Architects and builders are, I am afraid, to blame for a good deal of poor gasfitting in towns where the fittings are not examined by an inspector before being plastered over. Tenders are sometimes invited for gasfittings—only specifying so many lights per house. Consquently, one plumber will allow for one size of pipe, another for another size; and the one who sends in the lowest tender gets the job. Then, when the consumer cannot get a proper light, we are blamed for bad gas. In Ossett I have been appointed Inspector of Gasfittings. With this authority, I sent a circular round to all architects, builders and plumbers in the district, specifying what size of fittings I required; and now tenders are often invited for so many lights per house, fitted in accordance with my official specification. This is very much better. The plumbers all now tender on an equal footing, the public also greatly benefit by the improved light they obtain, and the property owner gets something that he probably knows nothing about protected and inspected free of charge. I require 48 hours' notice before any fittings are plastered over; and the men do not connect the gas to any new property until my certificate has been obtained.

The following is the method we use of booking this work:

These forms are bound into a book. We have on the one page tenant's application, landlord's authority, and materials used priced out. An index to this book is kept; so that we can turn at once to any house.

We also carry the prices out under their separate headings into a summary book, so that we can easily get at the total cost.

No....

	£	s.	d.
....Slot meter			
....Cooker			
....Pendant			
....Brackets			
....Compo. pipe			
....India-rubber tube			
....Taps			
....Burners			
....Time			
....			
....			
....			
.....			
Total			

No....

TENANT'S APPLICATION
FOR
SLOT METER AND FITTINGS.
(For Small Cottage House only.)

To the Ossett Corporation Gas Committee.

I hereby request you to supply and fix at my residence, subject to the undermentioned conditions, the following articles:—....Slot meter, ...Slot cooker, ...Pendant, ...Brackets, ...Burners, together with the necessary piping and connections.

I undertake to deliver to the Corporation when leaving the premises, or on demand, the above articles in good order and condition (ordinary wear and tear excepted), and to replace any of the same which may be damaged whilst in my possession; at the same time relinquishing all claim to such damaged article or articles.

I also undertake to hold myself liable for all gas registered by the index of the meter should the automatic arrangement become deranged in any way, and to give free access at all reasonable hours to the Corporation's officials for the collection of the money or any other necessary purpose.

Signature of tenant.....
Address.....
Date.....

DECLARATION TO BE SIGNED BY LANDLORD OR AGENT.
(To be obtained by the Tenant.)

I hereby authorize the Ossett Corporation to fix and remove if necessary the above articles. The cost to be borne by the Corporation; but such articles shall remain the property of the Corporation, and shall not be distrainable for rent.

Signed.....
Date.....

Insurance against Claims.—In undertaking internal fitting work, we, of course, increase the chance of possible claims being made against us for damages caused by gas escaping owing to alleged defective workmanship. A case in point occurred at Brighton about 12 months' ago. The Brighton and Hove Gas Company were sued for, and had to pay, damages for injury said to have been caused by gas escaping from fittings not put in by the company, but to which the company had attached a pipe to supply a gas fire. This is a serious matter, and opens up the question whether it would not be advisable to protect ourselves in some way from these possible claims. I have paid damages for gas escaping from the main up an old drain into a house, and also for one of my men leaving a flag up and someone stumbling into the hole. These, together with the further risks I have incurred (as shown by the Brighton case), have brought me to the conclusion that it is advisable to take out an insurance policy, covering all these third party risks; and I have at the present time got in hand policies and prices to lay before my committee at their next meeting. Premiums for these policies are very heavy; and if all gas undertakings would join together to form a mutual insurance fund, I believe we could fully protect ourselves at a very much cheaper rate.

The adoption of internal fittings has brought me more worry and work; but the time has come when we cannot afford to sit in our office all day. It has taken me into every nook and corner of my district of supply, and brought me into much closer touch with my consumers, which is in itself a strong argument in favor of our undertaking internal fitting work.

THE Malden (Mass.) Electric Company has petitioned the Board of Gas and Electric Light Commissioners for the right to increase its capital stock in the sum of $175,000.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE bonds of the city of Charlotte, N. C., having been validated by the Supreme Court of that State, work will soon be commenced on the new water works' pumping station and filtration plant. Mr. A. E. Boardman has been retained to prepare the plans and specifications for the plant, and the construction will be virtually carried on under his active supervision.

"A. S.," WRITING from Philadelphia under date of the 12th inst., says that Mr. William E. Barrett has resigned the post of General Manager of the Merion and Radnor (Pa.) Gas and Electric Company, to act as General Manager of the Scranton (Pa.) Gas and Water Company.

AT the annual meeting of the Lancaster (Pa.) Gas Light and Fuel Company, and of the Edison Electric Illuminating Company, of the same city, the following Directors were elected to supervise the affairs of both concerns: W. W. Griest, P. E. Slaymaker, P. B. Shaw, R. H. Brubaker, John Hertzler, J. Fred. Sener, H. C. Schock, H. K. Myers, H. L. Trout, Samuel H. Shipley, James Brown, J. W. B. Bausman, Charles B. Keller, Lindley M. Garrison and Charles H. Locher.

THE following is from a recent issue of the Wilmington (Del.) *Every Evening:* "Within 30 days a new Gas Company will apply to the Street and Sewer Department for a franchise to use the streets of Wilmington for the purpose of laying gas pipes in order that it can supply gas to the citizens of Wilmington. The new Company is the Commercial Light, Heat and Power Company, which was incorporated on November 28th. The incorporators are F. D. Lackey, George R. Anderson and W. J. Lackey. The new concern has posted notices on the streets to the effect that it will apply to the Street and Sewer Department for permission to use the streets of the city for laying pipes. Application cannot be made within 30 days of the date of the posting of the notice."

MR. E. G. PRATT, General Manager of the Milwaukee (Wis.) Gas Light Company, says that the handsome and complete new modern plant of the Company in the Menominee Valley district will be in operation within a fortnight.

A CORRESPONDENT in Washington, D. C., writing under date of the 14th inst., says: "The Georgetown (D. C.) Gas Light Company, at their annual meeting last week, elected Mr. W. Riley Deeble President of the Company, to fill the vacancy caused by the death of President Winship last week. Mr. Deeble is a Georgetown man, and he is a warm personal friend of Mr. John R. McLean, the President of the Washington Gas Company, which controls the Georgetown Company. Mr. Deeble is a prominent real estate broker and insurance man, having been interested in some of the most important realty transactions of recent years in the District. He was formerly the President of the Potomac Insurance Company, but resigned that position for the purpose of the consolidation of the Potomac and Lincoln Companies. He is now a Director in the Potomac."

THE N. Y. *Sun* of last Wednesday said that in a circular to the shareholders of the Brooklyn Union (N. Y.) Gas Company, formally calling a meeting for the 30th inst., to authorize an increase in the capital stock from $15,000,000 to $20,000,000, President James Jourdan explains that the stock is to provide additional funds to enable the Company to reconstruct and materially enlarge its manufacturing plants, purchase additional real estate, construct several large holders, lay miles of large pumping mains to convey gas to localities remote from the works, extend the general supply mains and install thousands of new house services and meters. The circular makes public for the first time that, pending the issue of the new stock, it is proposed to issue and sell convertible debentures in sufficient amount to provide $3,000,000. Of the increased capital stock $3,000,000 is to be held for the redemption of these debentures, and the remaining $2,000,000 is to be reserved for future sale when the business of the Company requires additional funds. The debentures are to bear interest at 6 per cent. and to be convertible at the option of the holder into stock at par on and after 3 years from the date of issue. Debentures not converted shall be redeemed in cash at par 5 years after the date of issue. The debentures will be offered to the stockholders of record of December 10 in proportion to the number of shares standing in their names at the rate of 1 bond for every 5 shares of outstanding stock. Payment is to be made on March 1 next, but subscriptions may be paid during February, and interest at the rate of 6 per cent. will be allowed until March 1.

MR. B. C. COBB, President of the Michigan Gas Association, has issued the following circular, dated Saginaw, the 14th inst., which we are sure will bring about good results: "Do not forget that the next meeting of the Michigan Gas Association will be held in Saginaw, February 17th and 18th, 1904, and plans are being laid to make it a good one in every respect. Also, do not forget that in order to make our Association successful and prosperous, new members, both active and associate, are always needed.

"In order to secure new members, it is necessary for the present members of the Association to do a little hustling and use their persuasive efforts with other gas men outside the fold. Just stop to think, how much it would mean to the Association if each member now on the rolls could bring to our meeting, in February next, one new application. Certainly, one application for each man ought not to call for a mighty effort on our part.

"The Michigan Gas Association, during its years of existence, has been of a great deal of benefit to us all, and has grown rapidly both in membership and character of its work, and all of us want it to keep right on in the same good way. It cannot, however, keep on increasing and developing unless each one of us makes an individual effort to help in every way possible.

"Won't you, therefore, give this matter your own personal attention, that the number of new members enlisted the coming year may be the largest on record. Application blanks may be secured from Mr. H. W. Douglas, Secretary, Ann Arbor, Mich., and it is hoped you will not neglect the opportunity of asking for them."

A MORTGAGE of $2,700,000 was recently filed in the office of the Clerk of Somerset County, N. J., by the Public Service Corporation, of New Jersey, in favor of the Fidelity Trust Company, of Newark, to secure the issue of bonds to complete the merger of the Somerset Lighting Company, the Plainfield Gas and Electric Lighting Company and the Citizens Electric Company. The new corporation will be known as the Somerset Union and Middlesex Lighting Company. H. G. Runkle is President of the new Company, and it is understood that the home office will be located at Plainfield.

AS was to be expected, the contract for the supplying of all the gas to be used on the grounds and in the buildings devoted to the purposes of the World's Fair, in St. Louis, next year, has been awarded to the Laclede Gas Light Company.

ACCORDING to the New Haven (Conn.) *Register*, Mayor Studley has agreed to the terms of the contract under which the public street lighting of that city, in so far as the same will be performed by gas, for the next 3 years, has been awarded to the New Haven Gas Light Company. It is understood that the minimum number of lamps required will be 1,050, that the candle power of each (incandescent type) shall not be less than 60, and that the price is $26 per lamp per annum.

SUPERINTENDENT ROBINSON, of the Ypsilanti (Mich.) Gas Company, is now receiving his patrons and friends in the Company's handsome new office quarters in the Quirk Building on Washington street.

AT the annual meeting of the shareholders in the United Gas and Electric Company, of Dover, N. H., the following officers were elected: Directors, George E. Wallace, Albert Wallace, J. F. Lang, Chas. B. Davis, H. L. Shepherd, John Kivel and George E. Macomber; President, Albert Wallace; Treasurer, George G. Welsh; Clerk, Leslie P. Snow; General Manager, Thomas Hawken.

THE plant of the Hamburg (Pa.) Gas Company will be located on a site on South Front street in that city, close to the factories of the Snell & Meharg Machine Works.

A CORRESPONDENT in New Bedford, Mass., says: "Matapoisett will rub along with kerosene, candles and any other old thing for light at present, as the proposition for the introduction of electric lights has fallen through. The New Bedford Gas and Edison Light Company wished for a guarantee of $1,000 worth of business per year, and the summer residents did not want the service unless the wires were buried, which would have been so costly a proceeding that neither the Company nor the summer residents cared to assume the burden."

THE Peoples Gas Light and Coke Company, of Chicago, has given out the following notice:

"Owing to the constantly increasing demand for natural gas and its limited supply, we desire to caution our patrons in the matter of economizing in its use in furnaces and other methods of heating.

"The amount consumed by furnaces and boilers for heating buildings is so subject to sudden changes of temperature that we cannot emphasize too greatly the importance of economy in the use of natural gas for heating purposes. We would, therefore, recommend that those of our patrons who are depending upon this fuel for heat take the precaution of providing themselves with additional means of heating during exceptionally cold weather, when, for a temporary period, the supply of natural gas may not be adequate to meet a suddenly increasing demand."

JUDGE HOOK and Mr. William Tracy have disposed of their interests in the Peoples Light, Heat and Power Company, of Salina, Kan., to Mr. T. B. Whithed, of Denver, Col.

MR. GEORGE W. NICORINGHANS, Manager of the National Enamelling and Stamping Company, has secured a franchise for the construction and operation of a gas plant at Granite City, Ills.

THE Springfield (O.) Gas Engine Company received the first premium for an exhibition of gas engines at the Sixth Annual Industrial Exhibit, Osaka, Japan.

THE Lee County Lighting Company, of Dixon, Ills., is about commencing to supply gas. The Company in its preliminary canvas agreed to follow the liberal policy shown in the appended abstract from its circular in these regards: "The service pipes will be run from the mains to the inside of the buildings free of charge to the consumer. All piping inside the buildings will be charged for at a reasonable rate by the lighting Company. Gas stoves will be sold to consumers by the Lighting Company at about actual cost of the stoves and work of setting. Also chandeliers and gas fixtures will be kept and sold to the consumer at about cost to the Lighting Company."

THE following is from the Boston (Mass.) *Journal*, dated the 11th inst.: "The first meeting of the incorporators of the Boston Consolidated Company, which will consolidate all of the local Companies, was held yesterday and and James L. Richards, President of the various Addicks Companies, was elected to that office in the new corporation. The incorporation papers of the new concern were subsequently filed with the Commissioners of Corporations, with the following gentlemen as incorporators: Robert Winsor, Samuel Carr, James L. Richards, S. Reed Anthony, Charles G. Smith, Robert E. Townsend, Henry B. Chapin, William S. Spaulding, Neal Rantoul and Charles A. Stone. The consolidation of the various Companies, including the Boston, South Boston, Roxbury, Bay State of Massachusetts, Brookline, Dorchester, Jamaica Plain and Massachusetts Pipe Line Gas Companies, was authorized by the last Legislature. The incorporators will present a petition to the Gas and Electric Light Commissioners for the right to take over the old Companies, and after a series of public hearings, the Board will decide upon the capitalization, issue of stock, etc. The consolidation has been held in abeyance because of the various suits now pending, brought to nullify the sale of the stocks of the four Addicks Companies, Boston, Roxbury, South Boston, and Bay State of Massachusetts to the Massachusetts gas interests."

ST. PAUL, MINN., has reached that state of cityhood which seemingly is to determine that the moonlight table for street lighting service must go.

THE *Petroleum Gazette* says that during the year now drawing to a close the profits afforded by the oil and gas industries have unquestionably had wider distribution than during the previous year, and we believe the coming year will be more marked in this respect. As the independent factors in the business multiply and expand in strength there is a proportionate increase in the incentive for others to enter into the opportunities the business affords. There is still too much of a congestion of the profits of the oil and gas industries, but the sentiment bordering on superstitious awe, long entertained toward the monopoly absorbing these profits, has been rapidly changing within the past few years, and everybody identified with the business has now a better show. They can make it better if they choose, and judging the near future by the near past they can be expected to do so.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, DECEMBER 21, 1903.

A Brilliant Engineer.

Factory Inspector D. H. McAbee, of Indiana, recently received the following report from an engineer, who was asked to comply with the boiler inspection laws of the State:

"This is to certify that I have this day inspected—Unknown—steam boiler, manufactured by—Unknown—and the same has been tested by—Unknown—and that the same is a full and true statement of conditions found by me.

"Kind of labor—Unknown.

"Tensile strength, when known—Unknown.

"Seams, lap or butt—Unknown.

"How many rows of rivets—Never counted them; why?

"Heads of boilers, cast or wrought—Unknown. I wasn't there when it was made.

"Bursting pressure—Unknown. It never bursted.

"Internal or external furnace—Unknown.

"Are boilers properly braced or stayed?—Unknown.

"Any loose braces—Suppose braces were loose, what of it?

"Are there any stop valves between safety valves and boiler?—Why should such be necessary?

"Any scale or deposit in boiler?—Yes, some, of course. Impossible to keep a boiler perfectly clean.

"Explanations or remarks—Please give us some idea as to what you mean by these questions and what they are for, and maybe we can tell you something about what you want."

The Market for Gas Securities.

The market for city gas shares showed much animation last week, and about all of the trading in Consolidated was accomplished at very much higher prices than those ruling for the past 3 months. The closing to-day (Friday) was reported at 187¾ to 188, and the outlook for the near future is all in favor of the proprietors. Some inquiry was made for Mutual, but the nominal quotations (260 to 300) cannot be accepted as anywhere near real values. A bid of 325 might bring out some actual stock. City gas bonds, especially New York and East River 5's, are readily salable.

Brooklyn Union is 205 bid, with small lots offered at 210. Our item columns give the particulars respecting the proposed increase in the Company's indebtedness, which increase virtually amounts to 33⅓ per cent. It looks that the Company proposes to retain its independence; that is, a combination of any kind with the Consolidated seems very unlikely. Peoples, of Chicago, is steady, and Buffalo gas is 6½ bid, offered at 8. Detroit gas is 71 bid, and it may be said it is worth at least 5 points more. Cincinnati Gas and Electric is on the ascending scale, and Laclede, preferred, is on the mend. The bid price is 90, but we think 95 would not bring out much stock.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

DECEMBER 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$78,177,000	100	187¾	188
Central Union, Bonds, 5's.	3,000,000	1,000	104	106
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	260	300
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. Bonds, 5's	11,000,000	1,000	103	105
Northern Union, Bonds, 5's.	1,250,000	1,000	105	106¼
New York and East River Bonds 1st 5's	3,500,000	1,000	102	106
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	135	140
Preferred	5,000,000	100	155	170
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	205	210
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅛	¼
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	6¼	8
" " Bonds, 5's	5,250,000	1,000	73	76
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	97⅛	98
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	107½	109
Consumers, Jersey City Bonds	600,000	1,000	100	102
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	..	59½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	87	95
" Prior Lien 5's	5,603,000	1,000	99¼	100
Detroit Gas Co., 5's	581,000	1,000	71	73
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	25	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104¼	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	50	65
" Bonds, 6's	2,650,000	..	103½	106¼
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	79	90
Preferred	2,500,000	100	90	..
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	220	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	97¼	97½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	67	67¼
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	96½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	118	116
Extension, 6's	600,000	1,000	113½	115
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OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
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PHILADELPHIA, PA., Dec. 9, 1903.

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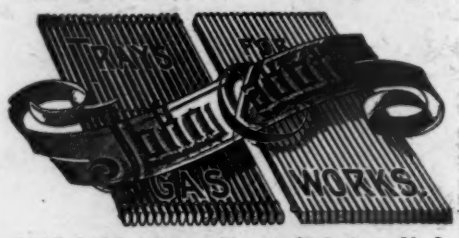

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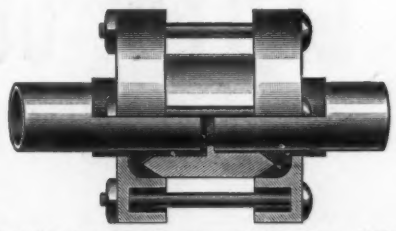
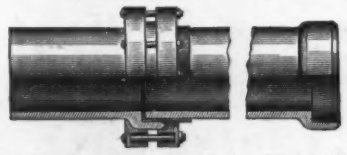
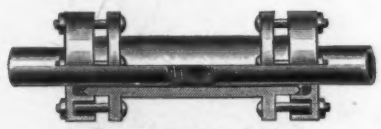


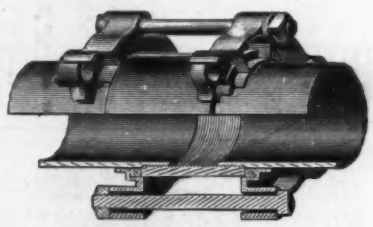
Insulating Coupling for Wrought Iron Pipe. Style 5.



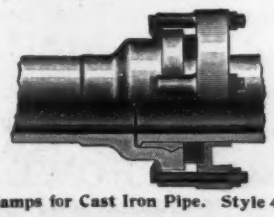
Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.



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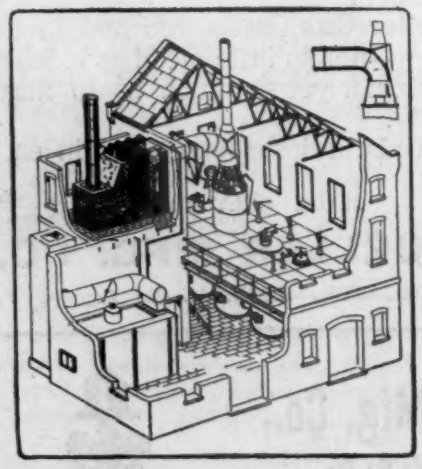

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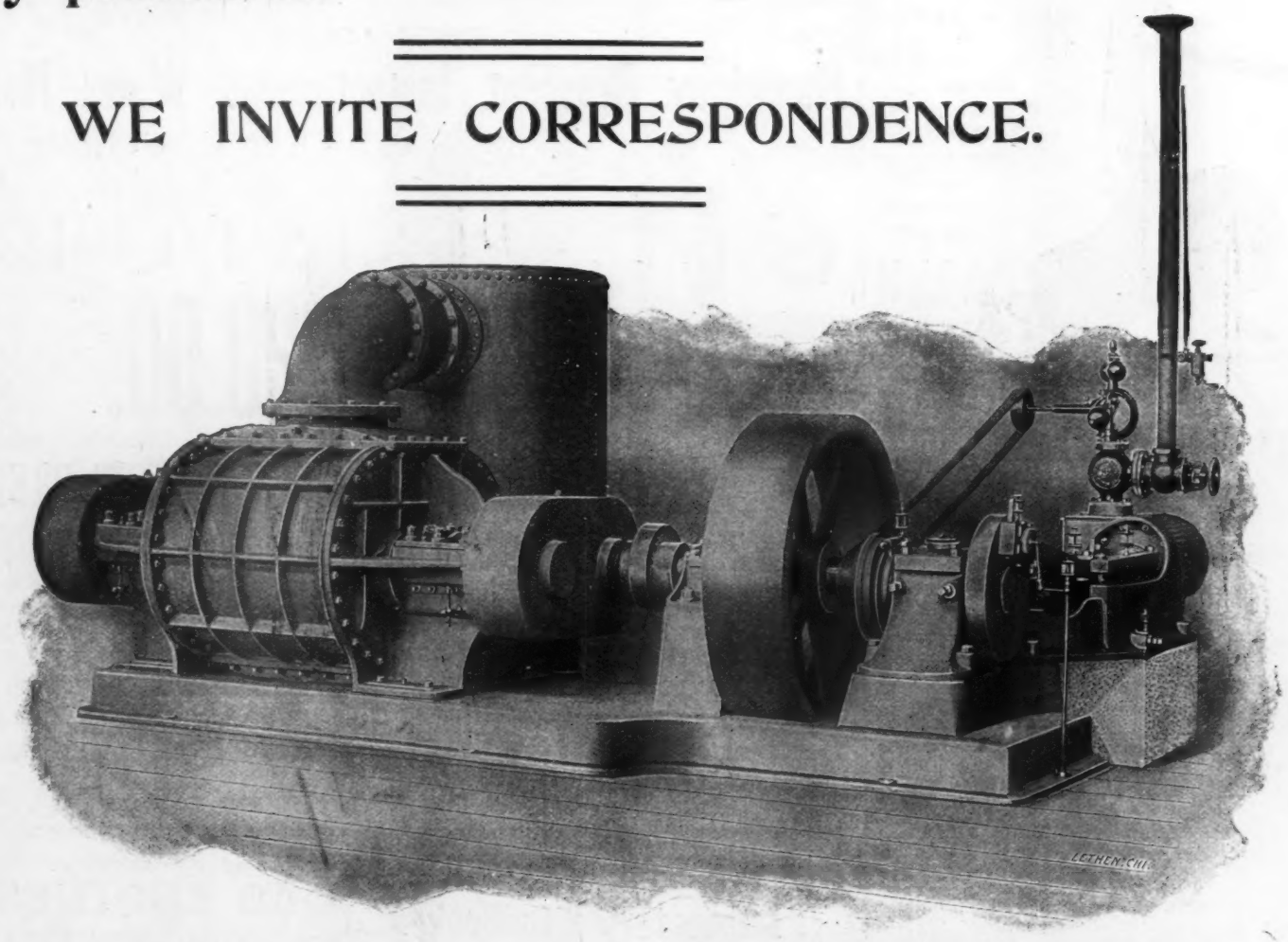

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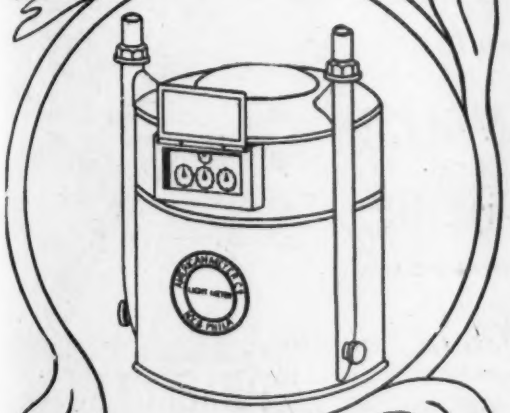
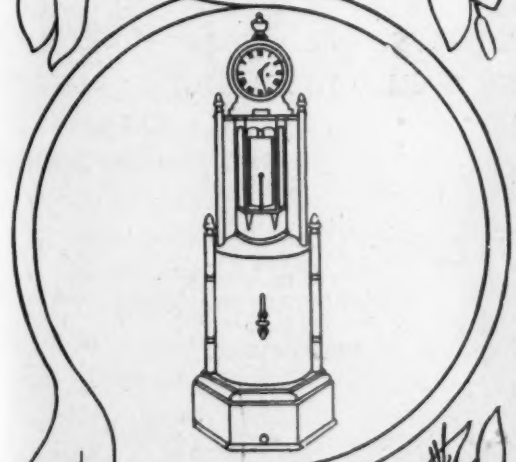




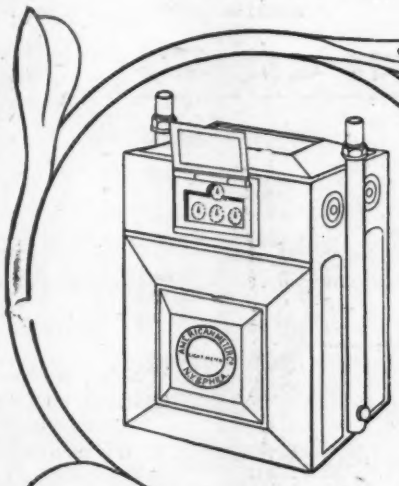
PUBLIC LIGHTING TABLE.

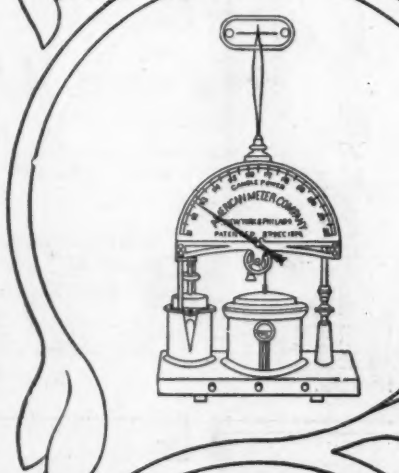
JANUARY, 1904.

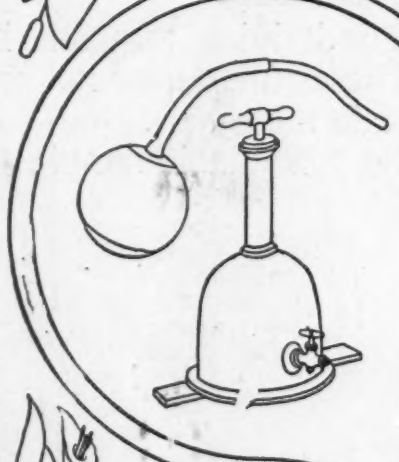
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Fri.	1	No L.	No L.	4.30	6.30
Sat.	2	No L. FM	No L.	4.30	6.30
Sun.	3	No L.	No L.	4.30	6.30
Mon.	4	5.20 PM	7.50 PM	4.30	6.30
Tue.	5	5.20	9.00	4.30	6.30
Wed.	6	5.20	10.20	4.30	6.30
Thu.	7	5.20	11.30	4.30	6.30
Fri.	8	5.20	12.30 AM	4.40	6.30
Sat.	9	5.20 LQ	1.40	4.40	6.30
Sun.	10	5.30	2.40	4.40	6.30
Mon.	11	5.30	3.40	4.40	6.30
Tue.	12	5.30	4.40	4.40	6.30
Wed.	13	5.30	5.30	4.40	6.30
Thu.	14	5.30	6.20	4.40	6.30
Fri.	15	5.30	6.20	4.50	6.25
Sat.	16	5.30	6.20	4.50	6.25
Sun.	17	5.30 NM	6.20	4.50	6.25
Mon.	18	5.30	6.20	4.50	6.25
Tue.	19	5.30	6.20	4.50	6.25
Wed.	20	5.30	6.20	4.50	6.25
Thu.	21	5.30	6.20	4.50	6.25
Fri.	22	9.00	6.20	5.00	6.25
Sat.	23	10.00	6.20	5.00	6.25
Sun.	24	11.00	6.10	5.00	6.25
Mon.	25	11.50 FQ	6.10	5.00	6.25
Tue.	26	1.00 AM	6.10	5.00	6.25
Wed.	27	2.00	6.10	5.00	6.25
Thu.	28	3.00	6.10	5.00	6.25
Fri.	29	4.00	6.10	5.05	6.15
Sat.	30	5.00	6.10	5.05	6.15
Sun.	31	No L.	No L.	5.05	6.15

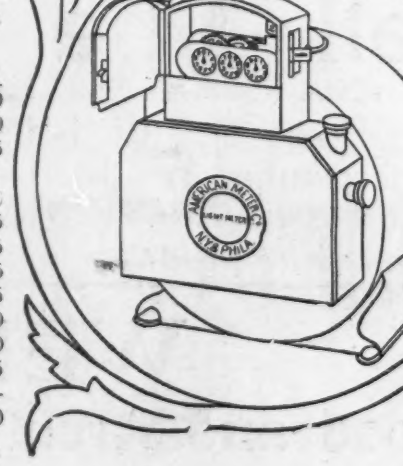
TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169.50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00









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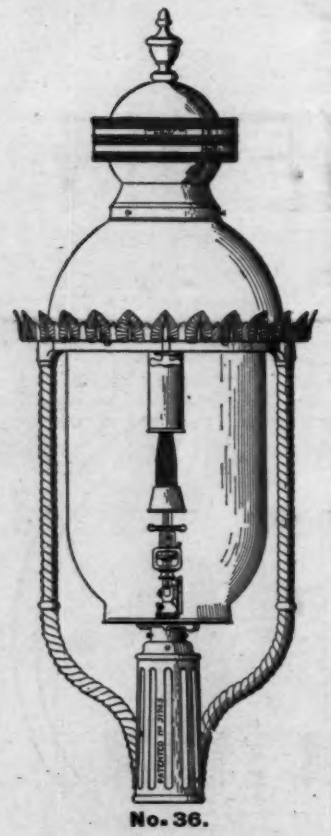
.... OF AMERICA ....



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Winsted, Conn.	Boone, Ia.	Easton, Pa.
Canon City, Col.	Pueblo, Col.	Lawrence, Mass.
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Hagerstown, Pa.	Fall River, Mass.	Chattanooga, Tenn.
Malden, Mass.	Duluth, Minn.	Tuckerton, N. J.
Bridgeport, Conn.	New York (Mutual Co.)	Springfield, O.
Albert Lea, Minn.	Waltham, Mass.	Easton, Pa. (2d contract).
Brooklyn, N. Y.	Dover, Del.	Mobile, Ala.

TOTAL DAILY SETS TO OCTOBER 15, 1903, ... 55
TOTAL DAILY CAPACITY, ... 56,600,000 cubic feet.
TOTAL SETS TO DATE, ... 502
TOTAL DAILY CAPACITY, ... 356,280,090 cubic feet.

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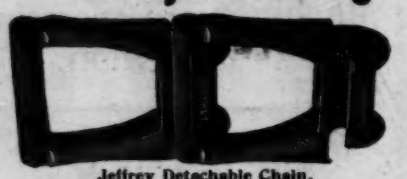

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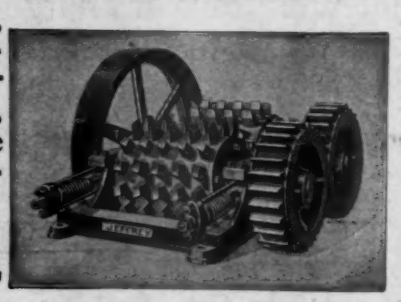

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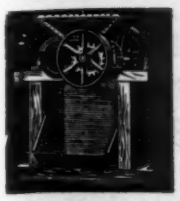

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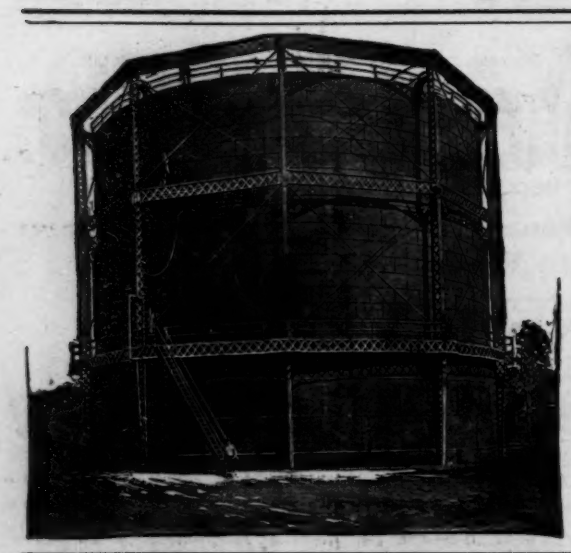

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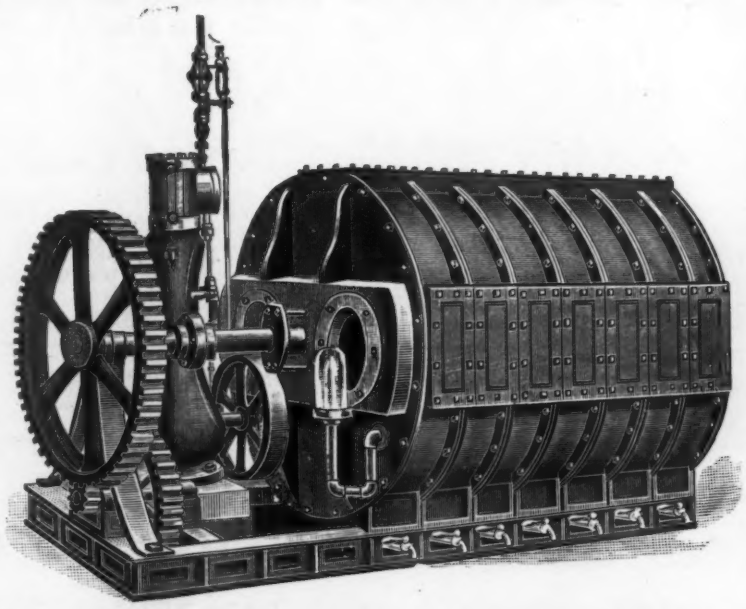

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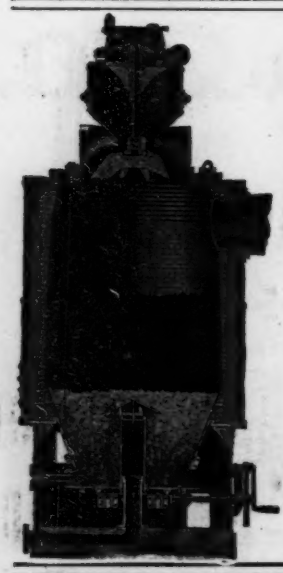

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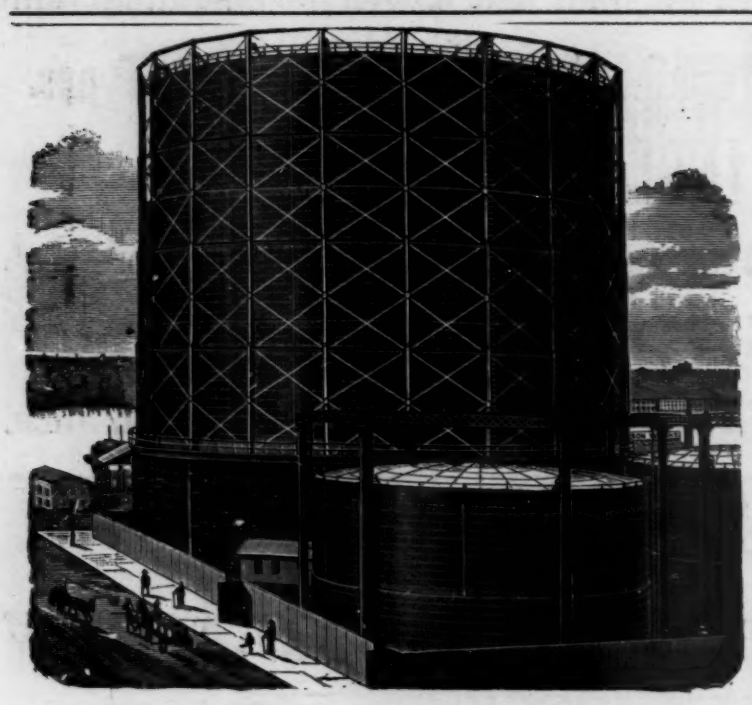

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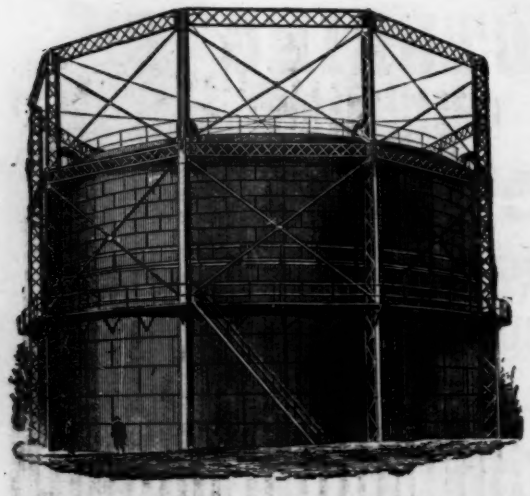

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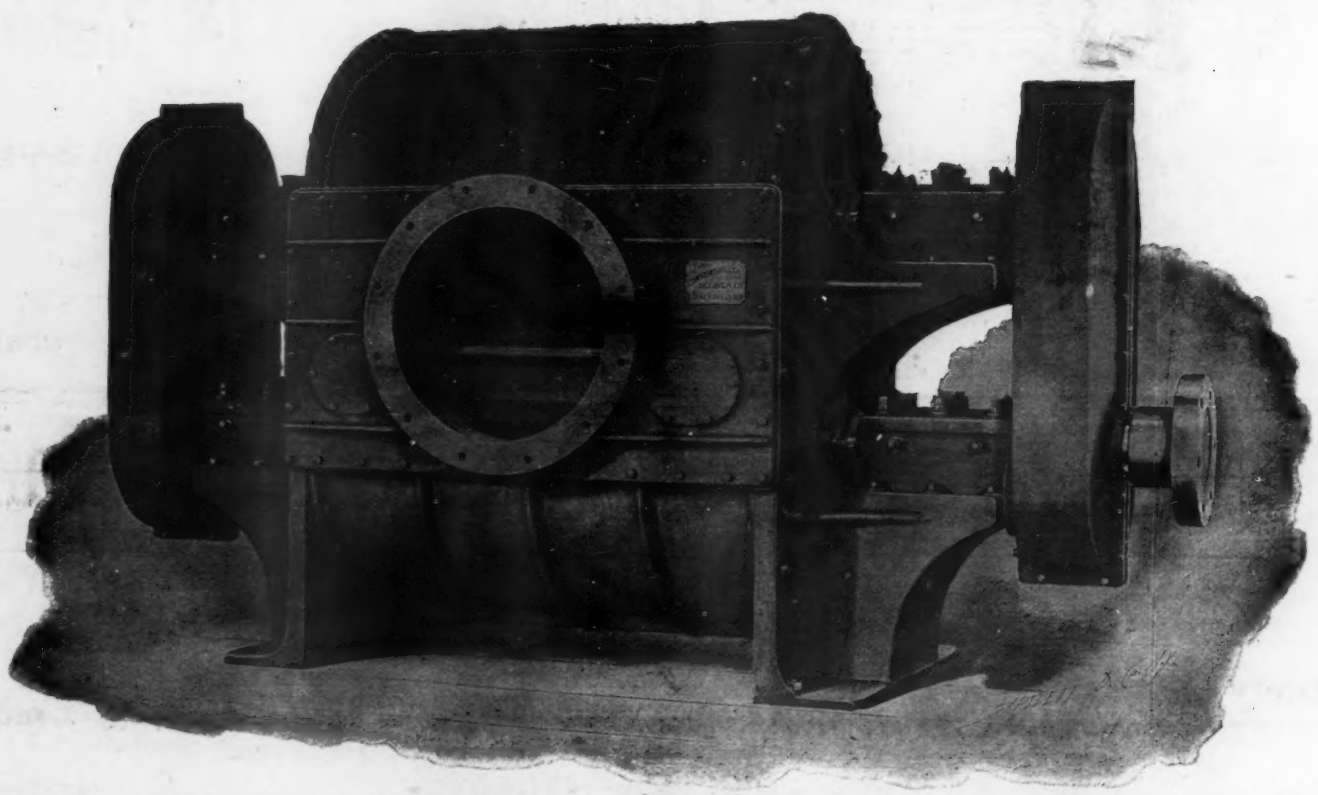

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